

Derwent
Top 100
Global
Innovator
2020

Susol Super Solution

Air Circuit Breakers



LS ELECTRIC



Susoi

Super Solution

Codes and standards

UA Series are manufactured and tested in accordance with the following standards Low-Voltage Power Circuit Breaker

- ANSI C37.13
- ANSI C37.16
- ANSI C37.17
- ANSI C37.50
- UL 1066 (cULus Listed)
- CSA C22.2 No.31-10

Note) Throughout this document, the phrase "ANSI Certified" means the product meets the requirements of UL 1066 and ANSI C37

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Premium Susol ACB meets your demands for high breaking capacity with full line-up up to 6000A, all in optimized frame sizes for panel design.

Various accessories and connection methods realize user-friendly handling.

Susol ACB provides the total solution with an advanced trip relay for measurement, diagnosis, analysis, and communication as well as protective functions for absolute protective coordination and electric power monitoring system.

Susol
Super Solution



**UL listed/ANSI certified
Low-Voltage Power Circuit Breaker UA series**

LS *SuperSolution* series



- **Modular design**
- **High (130kA) breaking capacity full line-up to 6000A**
- **Satisfy the needs for compact sized panels**
- **N-Phase conducting capacity 100%**
- **Interchangeable trip unit and rating plug**

Safety

Monitor temperatures for safety (Optional)

- Careful selection of materials
- Zero arc space
- Perform discriminations between upstream and downstream levels

User convenience

Various connection types for main circuit terminals

- Easy installation of accessories
- Interchangeable Trip unit and Rating plug

Intelligent trip relay

Various advanced functions for protection, measurement, diagnosis, analysis, communication



*Susol Manual
Motor Starters*



Susol Air Circuit Breakers

**UL 1066
ANSI C37**



Susol Molded Circuit Breakers



*Susol Magnetic Contactors &
Overload Relays*



Full line-up & Compact

Up to 6000A, Susol ACB provides a full line-up of 3 compact frame sizes.
Enables users to design panels of optimal volume.

800~1600AF

800~3200AF



85kA 100kA

UAS-08/16D

08	800AF
16	1600AF

85kA at 508Vac
W=13.15" (334mm) 3p,
16.50" (419mm) 4p

UAH-08~32E

08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF

100kA at 508Vac
W=16.22" (412mm) 3p,
20.75" (527mm) 4p

3200~6000AF



130kA

- High breaking capacity:
85/100/130kA (at 508Vac)
- 3 ampere frame sizes:
1600/3200/6000AF
- N phase current conducting capacity: 100%

UAH- 32~60G

32	3200AF
40	4000AF
50	5000AF
60	6000AF

130kA at 508Vac
W=30.91" (785mm) 3p,
39.96" (1015mm) 4p

Trip Relay (OCR)

Trip relays are classified according to function.

Trip relays are classified according to their uses and functions to maximize customers' satisfaction. Classified trip relays and easy installation.

- Protection: overload, short current, ground fault, earth leakage, under voltage, over voltage, under frequency, over frequency, reverse power, unbalance, etc
- Measurement: voltage, ampere, power, energy, frequency, power factor, harmonics, etc.
- Event & fault recording: Max. 256 events & faults
- Communication: Modbus/RS-485, Profibus-DP



Susol ACB trip relay, which can be interlocked with the breaker mechanism, provides the world's best protection. It improves the breaking capacity, enhances the ACB's life, and provides advanced functions - measurement, diagnosis, analysis, and communication.

Susol ACB Trip relay

N type



A type



P/S type



- L/S/I/G/Thermal
- Self Power
- RTC Timer mounted
- Fault information (LED)

- L/S/I/G/Thermal
- ZSI
- ERMS
- Modbus/RS-485
- Profibus-DP
- Self Power
- AC/DC 100~250V
- DC 15~60V
- RTC timer mounted
- Fault recording (10EA)

- L/S/ I/G/Thermal(Continuous)
- UV/OV/OF/UF/rP/Vun/Iun
- Measurement: V/A/W/Wh/F/PF
- Harmonics (63th), Waveform (S Type)
- ZSI
- ERMS
- Modbus/RS-485
- Profibus-DP
- AC/DC 100~250V
- DC 15~60V
- RTC timer mounted
- Event recording (256EA)
- Fault recording (256EA)
- Fault wave (S Type)

Trip relays series



N type (Normal)

- Self-power + Current protection



P type (Power meter)

- A type + Power meter + Voltage / Frequency / Unbalance protection



A type (Ammeter)

- Current meter + Current protection + DO control + Communication



S type (Supreme)

- P type + Harmonics analysis (63 th) + Fault wave recording

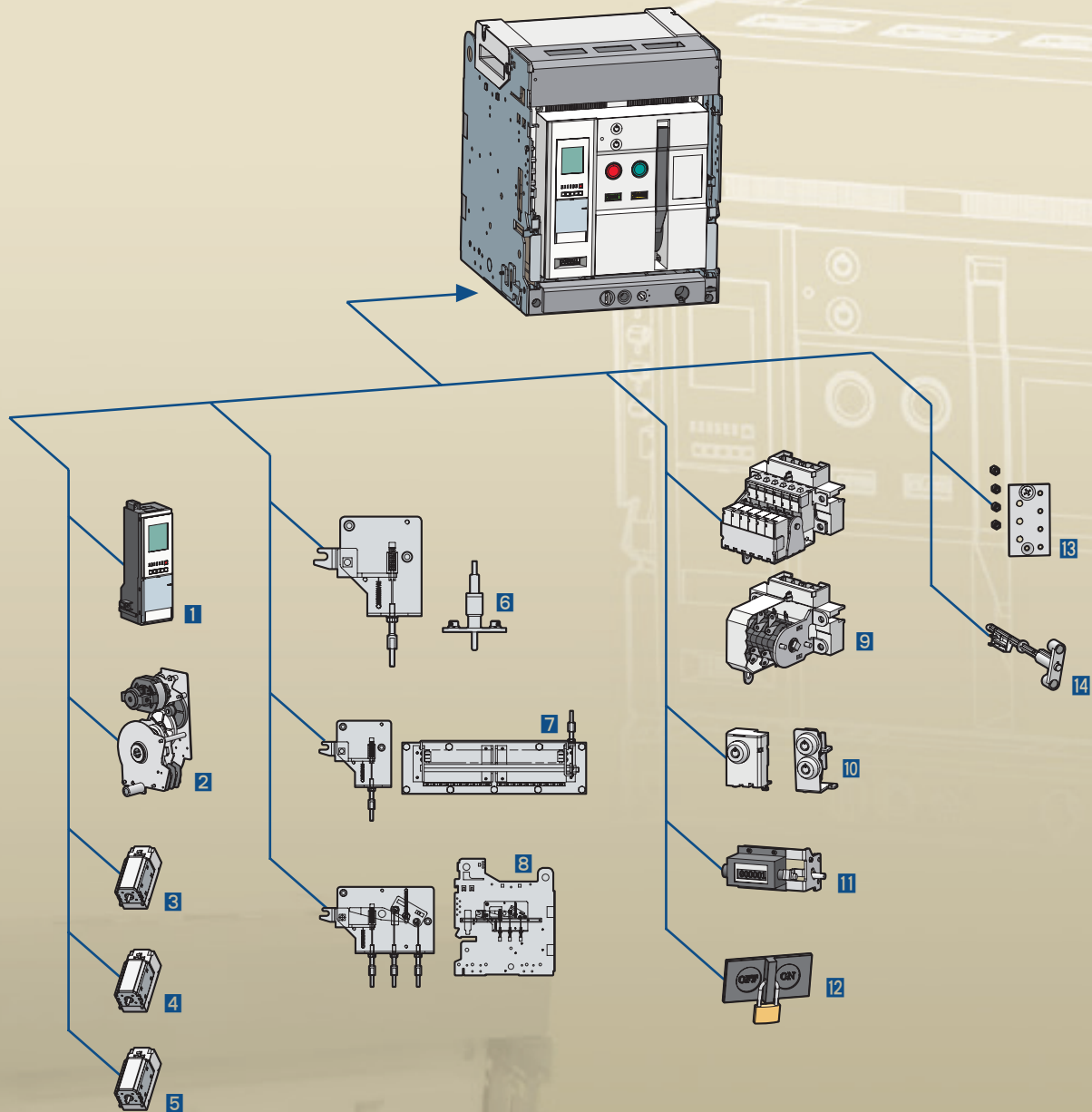


Rating Plug

Rating Plug for selection of rated current and frequency

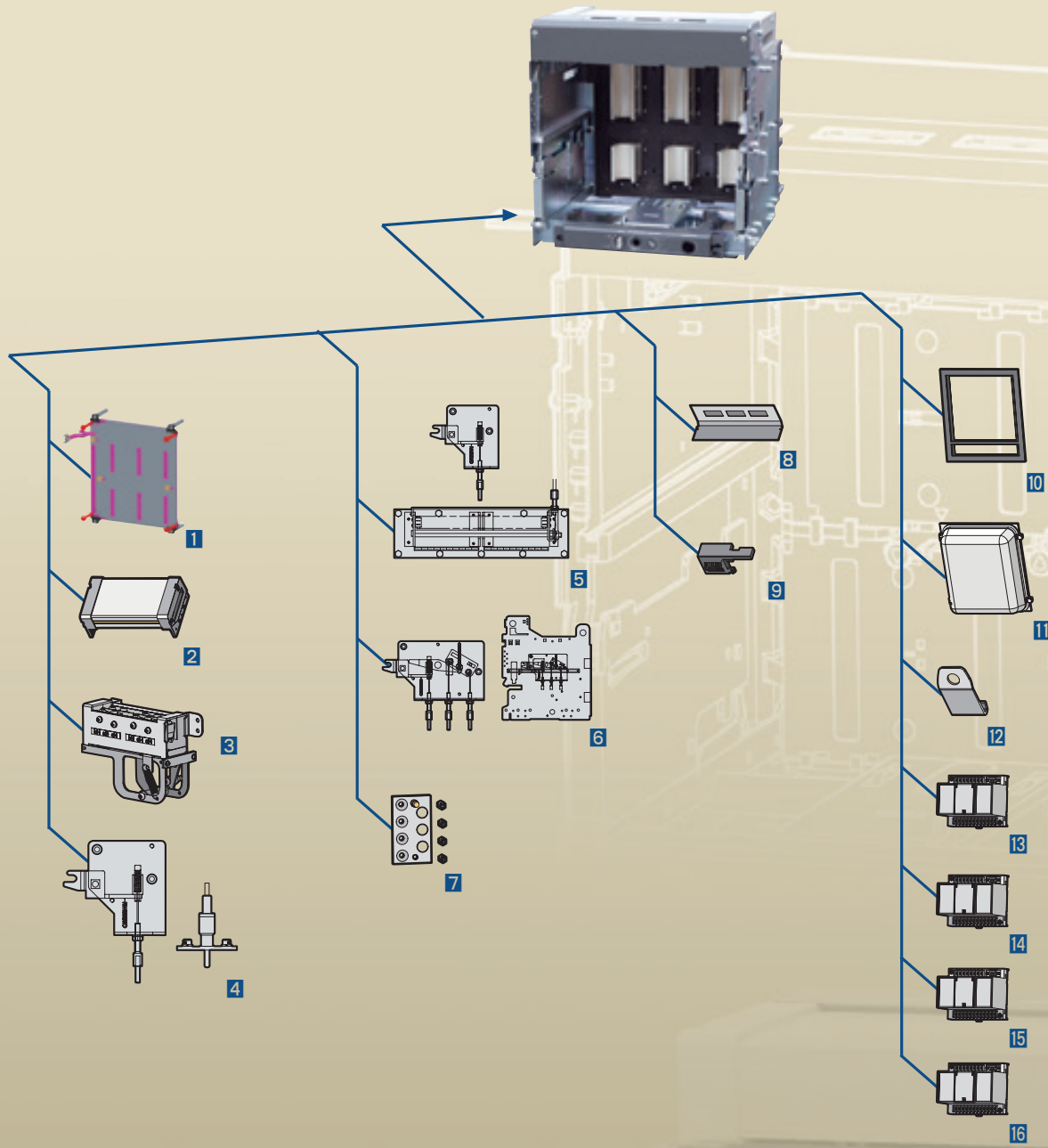
Rating Plug enables the changing rated current(I_n) without CT replacement
 Frequency selection switch: set to 50Hz or 60Hz

Accessories



ACB

- | | |
|-----------------------------------------------------|--------------------------------------------------|
| 1 Trip relay (OCR) | 9 Auxiliary Switch (AX) |
| 2 Motor (M) | 10 Key Lock (K1),
Double Key Lock (K3) |
| 3 Closing Coil (CC) | 11 Counter (C) |
| 4 Shunt Coil (SHT) | 12 Lockable On/Off Button Cover (B) |
| 5 Under Voltage Trip Device (UVT) | 13 Mis-Insertion Prevention Device (MIP) |
| 6 Door Interlock (DI) | 14 Manual Reset Button (MRB) |
| 7 MOC (Mechanically
Operated Cell Switch) | |
| 8 Mechanical Interlock (MI) | |



Cradle

- 1** Safety Shutter (ST)
- 2** Zero Arc Space (ZAS)
- 3** Cell Switch (CEL)
- 4** Door Interlock (DI)
- 5** MOC (Mechanical Operated Cell Switch)
- 6** Mechanical Interlock (MI)
- 7** Mis-Insertion Prevention Device (MIP)

Other

- 8** Safety Control Cover (SC)
- 9** Racking Interlock (RI)
- 10** Door Frame (DF)
- 11** Dust Cover (DC)
- 12** Lifting Hook (LH)
- 13** UVT Time Delay Controller (UDC)
- 14** Profibus-DP Communication Module
- 15** Remote I/O
- 16** Temperature Alarm

Connection and Installation



Diversified terminal connection methods of the ACB main circuit for users.

Multiple connections

Various installation methods

Standard connection



Horizontal type



Vertical type



Front type

Mixed connection



Horizontal / Vertical type



Vertical / Horizontal type



Horizontal / Front type



Vertical / Front type



Front / Horizontal type



Front / Vertical type

- **Front connection type is available to be connected regardless of the depth of main circuit terminal and it is suited for panels with limited installation space.**
- **The vertical and horizontal type terminal are module type which can be adjusted by rotating the module 90 degrees.**
- Please refer to the rating lists (Page 22~25) because the installation method varies according to the rated current.

External configuration

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Fixed type ACB



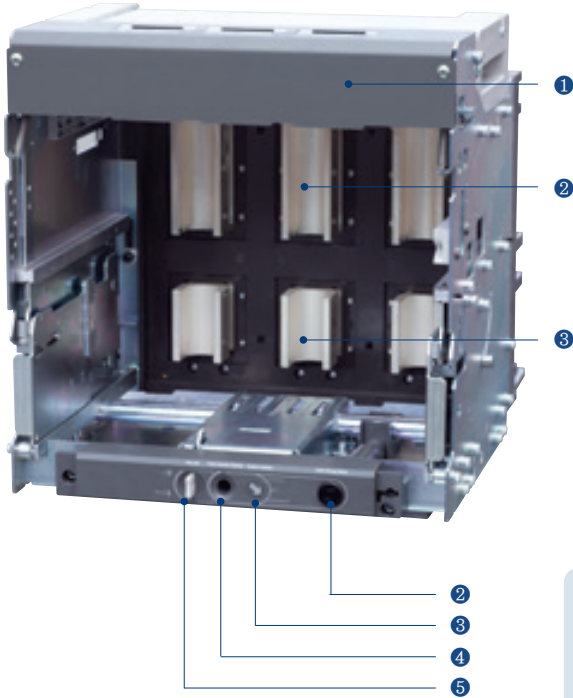
Terms

- ① Trip relay
- ② Counter
- ③ OFF button
- ④ ON button
- ⑤ Series name
- ⑥ Charge handle
- ⑦ Rated name plate
- ⑧ Charge/Discharge indicator
- ⑨ Closed/Open indicator
- ⑩ Corporation logo
- ⑪ Arc cover (Zero Arc Space)
- ⑫ Safety control cover
- ⑬ Cradle
- ⑭ Draw-out handle
- ⑮ Position indicator
- ⑯ Handle inserting hole
- ⑰ Pad lock button
- ⑱ Arc chute
- ⑲ Control cover
- ⑳ Fixed type bracket
- ㉑ Rating plug

Draw-out ACB (Cradle)



Cradle (Internal)



Cradle (Rear)




Terms

- ① Safety control cover
- ② Draw-out handle
- ③ Position indicator
- ④ Handle inserting hole
- ⑤ Pad lock button
- ⑥ Connecting conductor (Line side)
- ⑦ Connecting conductor (Load side)

Main nameplate

[Acronym explanation]




Low Voltage AC Power Circuit Breaker

Frame Size :

Poles :

Frequency : 50/60 Hz



UL 1066 / ANSI C37.13

Rated Maximum Voltage (V)	254	508	635
Rated Short Circuit Current (kA)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rated Short Time Current (kA)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Cat.

MFG. Date :

Serial No. :

MADE IN KOREA

[Secondary nameplate]

ACCESSORIES

<input type="checkbox"/> Motor charge	<input type="text"/>
<input type="checkbox"/> Closing coil	<input type="text"/>
<input type="checkbox"/> Shunt tripping coil	<input type="text"/>
<input type="checkbox"/> Auxiliary switches	<input type="text"/>
<input type="checkbox"/> OCR Control source	<input type="text"/>
<input type="checkbox"/> Alarm switch	<input type="text"/>
<input type="checkbox"/> Digital Trip Relay(OCR)	<input type="text"/>
<input type="checkbox"/> Alarm(LSIG) Reset	<input type="text"/>
<input type="checkbox"/> Zone Selective Interlocking	<input type="text"/>
<input type="checkbox"/> Communication	<input type="text"/>
<input type="checkbox"/> Earth/Leakage	<input type="text"/>
<input type="checkbox"/> Temperature sensor	<input type="text"/>

Available Adaptor
Not For Use As Service Equipment
Instruction manual 79563466001

Explanation of terminologies

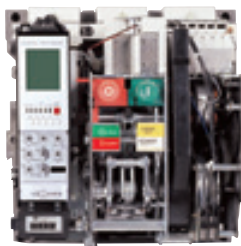
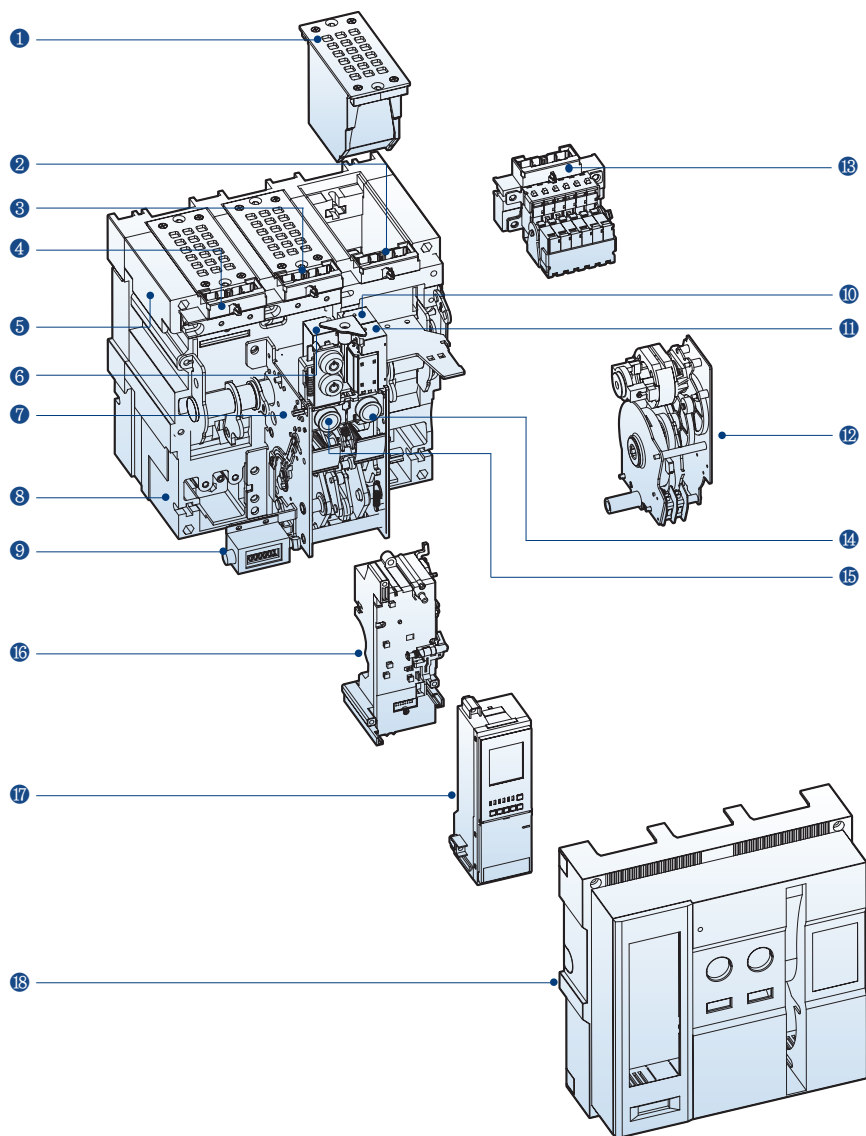
- Motor charge Control power and terminal No.
- Closing coil Control power and terminal No.
- Shunt tripping coil Control power and terminal No.
- Auxiliary switches: Contact specification and terminal No.
- Under voltage trip: UVT terminal No.
- OCR control source: Trip relay control power
- Alarm switch: Alarm and terminal No.
- Digital trip relay: Switching diagram
- Z.S.I: Input/Output terminal No.
- Reset: LED/LCD reset
- Communication: Communication and terminal No.
- Voltage module: Phase voltage and symbol
- Earth/Leakage: Ground fault / Earth leakage input terminal No.

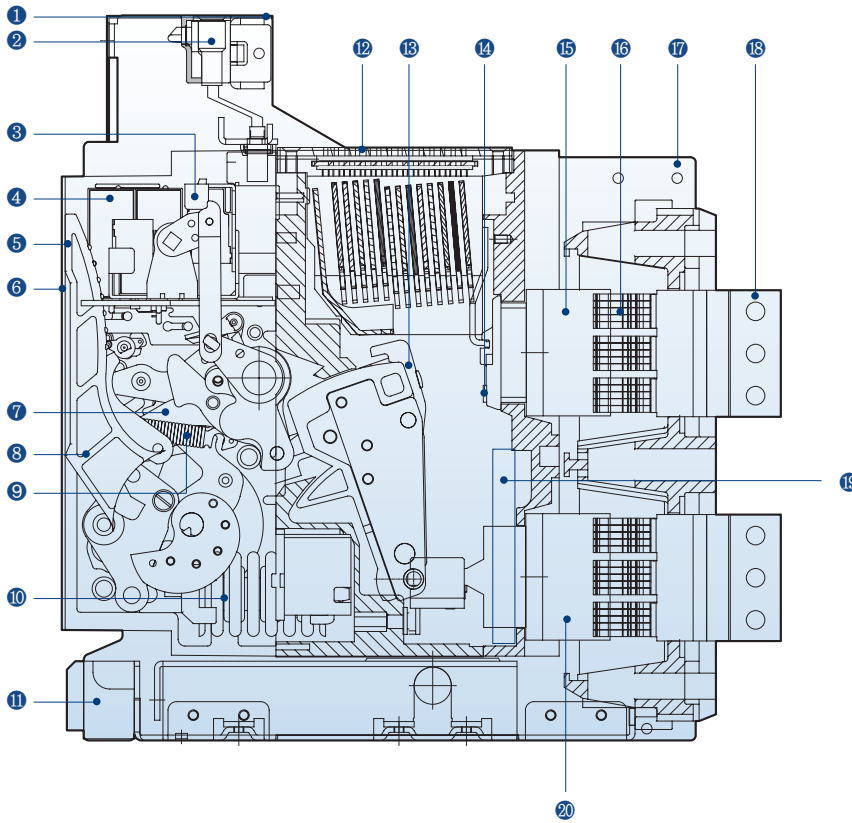
Internal configuration

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Terms

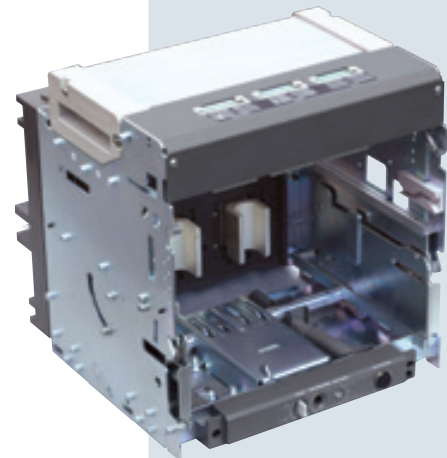
- ① Arc chute
- ② Aux. switch control terminal
- ③ Control power supply terminal
- ④ Trip relay control terminal
- ⑤ Carrying grip
- ⑥ Shunt coil or UVT coil
- ⑦ Mechanism
- ⑧ Main body
- ⑨ Counter
- ⑩ Shunt coil
- ⑪ Closing coil
- ⑫ Motor Ass'y
- ⑬ Aux. switch
- ⑭ Closed button
- ⑮ Open button
- ⑯ MTD base
- ⑰ Trip relay
- ⑱ Front cover





Terms

- ① Control circuit terminal block
- ② Control terminal
- ③ Auxiliary switches
- ④ Closing, Shunt, UVT coil
- ⑤ Trip relay
- ⑥ Front cover
- ⑦ Mechanism
- ⑧ Charge handle
- ⑨ Trip spring
- ⑩ Closing spring
- ⑪ Draw-in/out device
- ⑫ Arc extinguishing part
- ⑬ Moving contact
- ⑭ Fixed contact
- ⑮ Conductor on line side
- ⑯ Cradle finger
- ⑰ Cradle
- ⑱ Connecting conductor
- ⑲ CT (Current transformer)
- ⑳ Conductor on load side

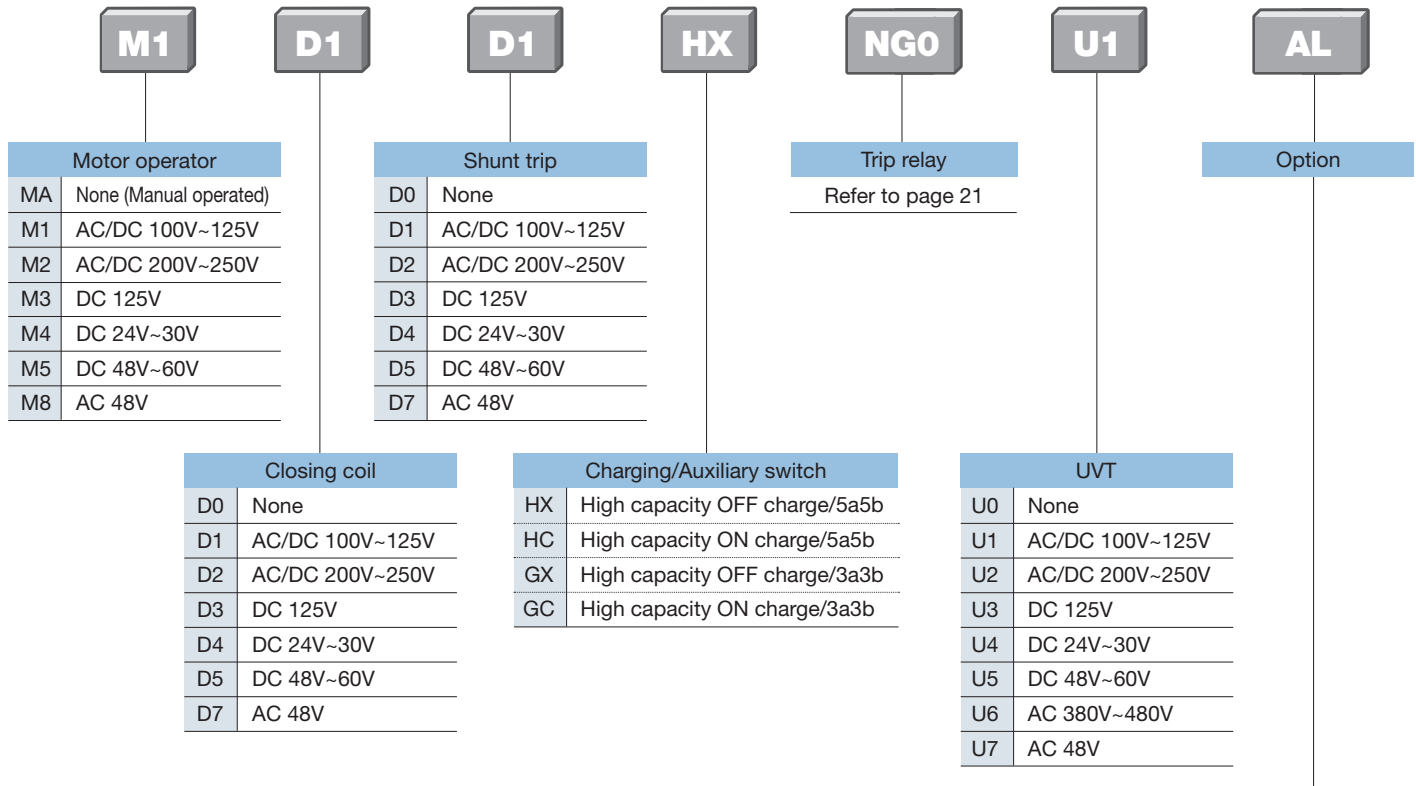


Ordering

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Breaker and accessories

Frame type	Frame size	Phasing	Poles	Sensor rating	Mounting and terminal
UAS	16	D	3	16	A
	08 800AF	D 3/4P standard	3 3P	04-08 400A~800A	Mounting
	16 1600AF	RST(N)	4 4P	08-16 800A~1600A	
		W 4P reversed NRST			Fixed
					H Horizontal terminals
					V Vertical terminals
					M Horizontal for line
					Vertical for load
					N Vertical for line
					Horizontal for load
					P Front terminal
					G Horizontal-con type
					W Vertical-con type
UAH	32	E	3	32	
	08 800AF	E 3/4P standard	3 3P	04-08 400A~800A	* Terminals for P type must be ordered separately
	16 1600AF	RST(N)	4 4P	08-16 800A~1600A	
	20 2000AF	X 4P reversed NRST		10-20 1000A~2000A	* G and W types can be applicable to D-Frame only
	25 2500AF			12-25 1200A~2500A	
	32 3200AF			16-32 1600A~3200A	* Front terminal is only available for 800~2000A
	32 3200AF	G 3/4P standard	3 3P	16-32 1600A~3200A	* 3200AF(E, X), 6000AF(G,Z) offers only vertical type terminals (Busbar).
	40 4000AF	RST(N)	4 4P	20-40 2000A~4000A	
	50 5000AF	Z 4P reversed NRST		25-50 2500A~5000A	
	60 6000AF			30-60 3000A~6000A	
UAA	16	D	3	00	
	08 800AF	D 3/4P standard	3 3P	Not applied	
	16 1600AF	RST(N)	4 4P		
		W 4Preversed NRST			
	08 800AF	E 3/4P standard			
	16 1600AF	RST(N)			
	20 2000AF	X 4P reversed NRST			
	25 2500AF				
	32 3200AF				
	32 3200AF	G 3/4P standard			
	40 4000AF	RST(N)			
	50 5000AF	Z 4P reversed NRST			
	60 6000AF				



Code	Description	Code	Description
AL	AL1+MRB	K	K1 Key lock
A1	AL1+MRB +RES (AC110~130V) *AC only	K2	K2 Key Interlock set
A2	AL1+AL2 +MRB	K3	K3 Key Interlock double
A3	AL1+MRB +RES (DC110~125V) *DC only	K5	K5 Profalux lock (CAMLOCK type)
A4	AL1+MRB +RES (AC200~250V) *AC only	K6	K6 Kirkkey lock (CAMLOCK type)
A5	AL1+MRB +Auto reset	K7	K7 Kirkkey lock (CN22 type)
A6	AL1+AL2 +MRB +Auto reset	R	RCS Ready to close switch
A7	AL1+MRB +RES (DC110~125V) +Auto reset *DC only	T	TM Temperature monitoring
A8	AL1+MRB +RES (AC200~250V) +Auto reset *AC only	H1	AC/DC 100V ~125V, Double shunt coil
A9	AL1+MRB +RES (AC110~130V) +Auto reset *AC only	H2	AC/DC 200V ~250V, Double shunt coil
S	CS2 Charge switch communication	H3	DC 125V, Double shunt coil
B	B Lockable On/Off button cover	H4	DC 24V ~30V, Double shunt coil
M	MI Mechanical interlock	H5	DC 48V ~60V, Double shunt coil
D	DI or MOC Door interlock or MOC (Mechanism operated cell switch)	H7	AC 48V, Double shunt coil

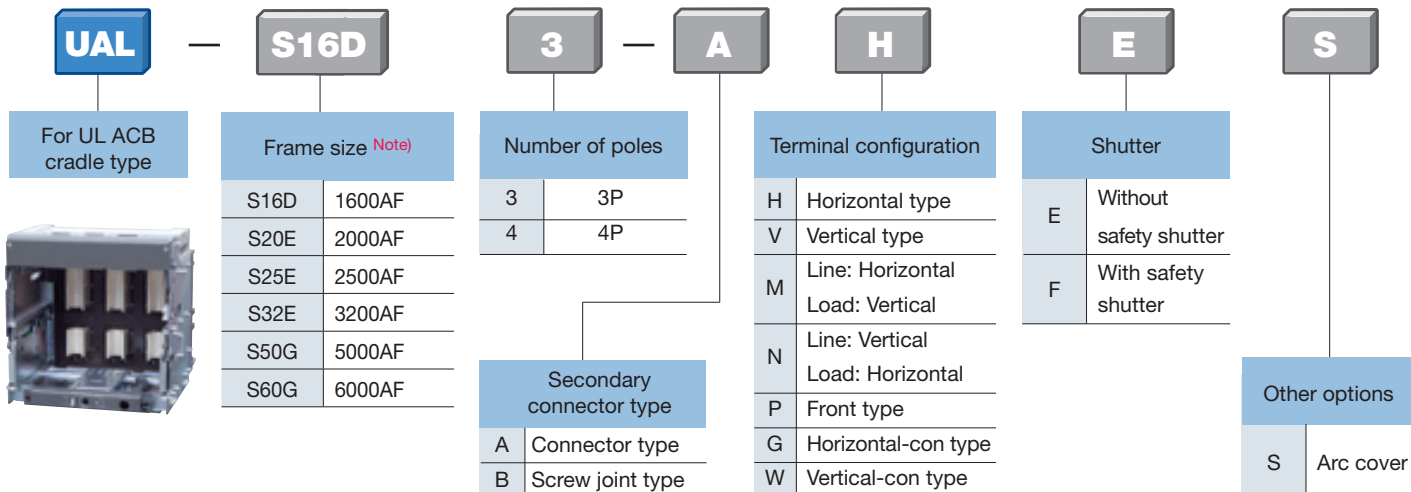
N01	A4 (AL1+MRB +RES(AC200~250V))+B(Lockable On/Off button cover)+K(Key lock)+R(Ready to close switch)+M(Mechanic interlock)+E(Spring auto release)
N02	AL (AL1+MRB)+K(Key lock(OFF lock))+R(Ready to close switch)+D(Door interlock or MOC)+H1(AC/DC 100V ~ 130V, Double shunt coil)+E(Spring auto release)
N03	B(Lockable On/Off button cover)+K2(Key interlock set)+R(Ready to close switch)+T(Temperature monitoring)
N04	A4(AL1+MRB+RES(AC200~250V))+B(Lockable On/Off button cover)+K(Key lock(OFF lock))+M(Mechanical interlock)+T(Temperature monitoring)
N05	A1(AL1+MRB+RES110~130V)+B(Lockable On/Off button cover)+K(Key lock(OFF lock))+R(Ready to close switch)+M(Mechanical interlock)+T(Temperature monitoring)
N06	A2(AL1+AL2+MRB)+K(Key lock(OFF lock))+R(Ready to close switch)+T(Temperature monitoring)

Note) 1. * Codes for over 5 optional accessories are composed separately 2. UVT and SHT2 can not be selected together. Select one of two.
3. C(counter) is provided as standard.

Ordering

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Adapter (Cradle)



Note) The corresponding Breaker Adapter

Breaker		Adapter
UAS-08D	UAS-08W	S16D
UAS-16D	UAS-16W	
UAH-08E	UAH-08X	S20E
UAH-16E	UAH-16X	
UAH-20E	UAH-20X	
UAH-25E	UAH-25X	S25E
UAH-32E	UAH-32X	S32E
UAH-32G	UAH-32Z	S50G
UAH-40G	UAH-40Z	
UAH-50G	UAH-50Z	
UAH-60G	UAH-60Z	S60G

* Terminals for P type must be ordered separately

* G and W types can be applicable to S16D (1600AF) only.

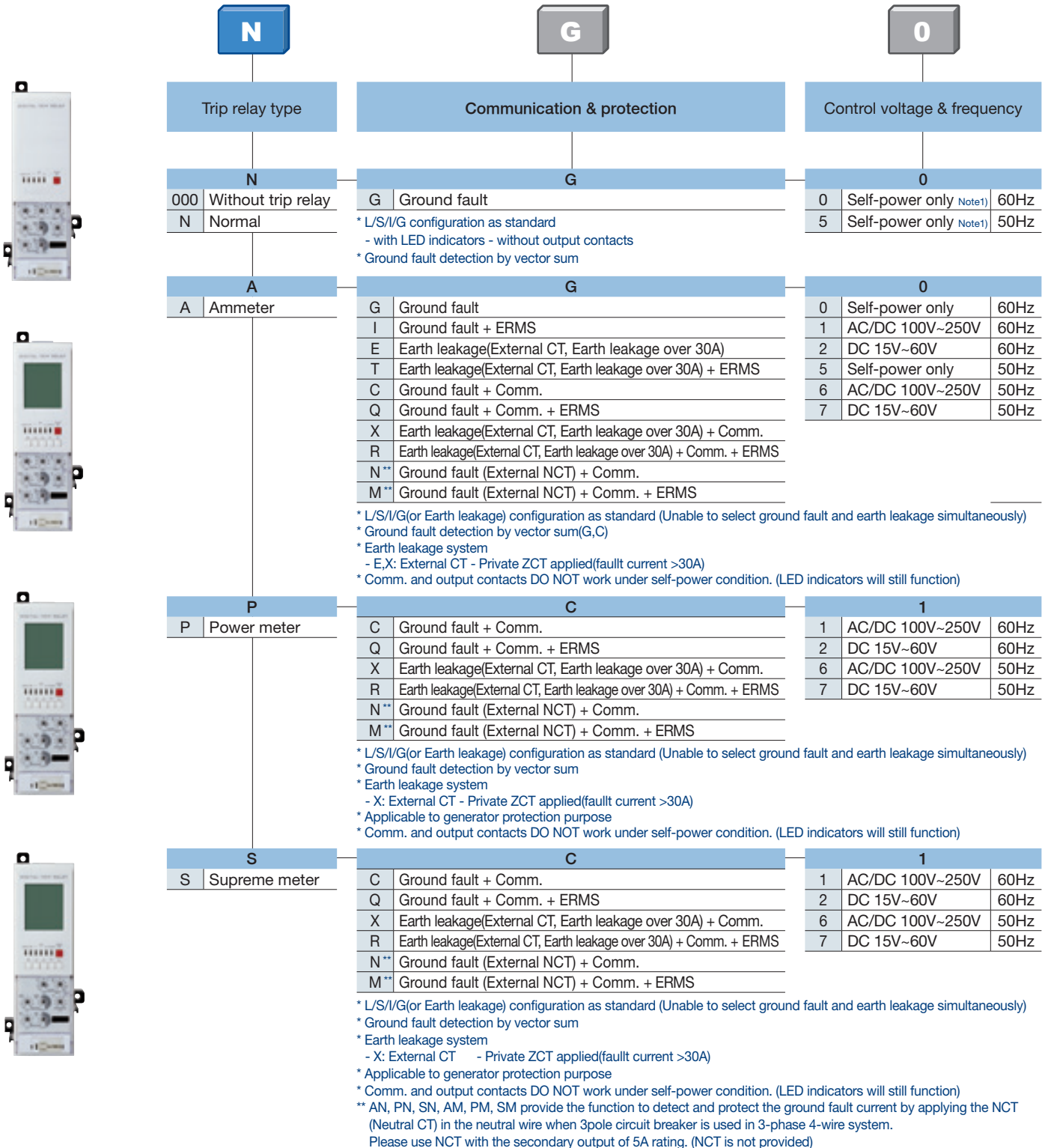
Rating plug

Rating plug classification			ACB ampere frame									
Rating plug code	For none NCT type	For NCT type	Rating	800A	1600A	2000A	2500A	3200A	4000A	5000A	6000A	
	73263466352	73263466372	400A	400A~800A								
	73263466353	73263466373	600A									
	73263466354	73263466374	630A									
	73263466355	73263466375	800A		800A~1600A							
	73263466356	73263466376	1000A									
	73263466357	73263466377	1200A									
	73263466358	73263466378	1250A			1000A~2000A						
	73263466359	73263466379	1600A									
	73263466360	73263466380	2000A				1200A~2500A					
	73263466361	73263466381	2500A									
	73263466362	73263466382	3000A					1600A~3200A				
	73263466363	73263466383	3200A									
	73263466364	73263466384	3600A						2000A~4000A			
	73263466365	73263466385	4000A									
73263466366	73263466386	5000A							2500A~5000A			
73263466367	73263466387	6000A									3000A~6000A	

* A rating plug ranging from 50 to 100% of the ACB ampere frame should be used.

* The minimum value of the OCR self-power supply is based on the CT rating, not the rating plug rating.

Trip relay



Note) 1. L/S/I/G(or Earth leakage) configuration as standard (Unable to select ground fault and earth leakage simultaneously)
 2. Ground fault, earth leakage and pre-trip alarm functions are mutually exclusive.
 3. Functions like Metering, Communication, ZSI, Remote reset and Digital output are NOT available only under Self-power condition.
 4. P and S types require voltage module to be purchased separately.

Ratings for UL Listed/ANSI Certified Susol UA Circuit Breakers

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Type					
AF					
Rated current (In max)	(A)			at 40°C	
Rated current	(A)			at 40°C	
Rated maximum voltage	(V)				
Frequency	(Hz)				
Number of poles	(P)				
Type of trip relay (Electronic trip device)					
Rated short circuit current (kA) (Sym.) UL 1066 ANSI C37.13		With instantaneous	AC	635V	
				508V	
		Without instantaneous	AC	254V	
				508V	
				254V	
Rated short time current	(kA)				
Operating time (t)	(ms)	Maximum total breaking time			
		Maximum closing time			
Life cycle	ACB	(time)	Mechanical	Without maintenance	
				With maintenance	
			Electrical	Without maintenance	
				With maintenance	
Weight	lb (kg)	Drawout type	Main Body	3P	
			with Cradle	4P	
			Only Cradle	3P	
				4P	
			Fixed type	Motor charging type	3P
					4P
External dimension	Draw-out type	in (mm)	H×W×D	3P	
				4P	
				4P	
	Fixed type	in (mm)	H×W×D	3P	
				4P	
				4P	
Enclosure dimension	in (mm)	H×W×D	3P		
			4P		



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UAS-□□□	
08	16
800	1600
	800
400	1000
600	1200
630	1250
800	1600
254V / 508V / 635V	
50 / 60	
3P / 4P	
N, A, P, S (4 type)	
65	
85	
85	
65	
65	
65	
65	
50ms	
80ms	
12,500	
-	
2,800	
-	
154 (70)	
187 (85)	
71 (32)	
84 (38)	
77 (35)	
99 (45)	
16.93×13.15×16.02 (430×334×407)	
16.93×16.5×16.02 (430×419×407)	
11.81×11.81×11.61 (300×300×295)	
11.81×15.16×11.61 (300×385×295)	
19.69×15.75×13.39 (500×400×340)	
19.69×19.69×13.39 (500×500×340)	



Susol				
UAH-□□E				
08	16	20	25	32
800	1600	2000	2500	3200
400	800	1000	1200	1600
600	1000	1200	1250	2000
630	1200	1250	1600	2500
800	1250	1600	2000	3000
	1600	2000	2500	3200
254V/508V/635V				
50/60				
3P/4P				
N, A, P, S (4 type)				
85				
100				
100				
85				
85				
85				
85				
50ms				
80ms				
12,500			12,500	
-			-	
2,800			1,000	
-			-	
214 (97)		245 (111)		326 (148)
269 (122)		309 (140)		414 (188)
99 (45)		123 (56)		205 (93)
121 (55)		152 (69)		256 (116)
101 (46)		110 (50)		196 (89)
126 (57)		137 (62)		249 (113)
16.93×16.22×16.02 (430×412×407)				
16.93×20.75×16.02 (430×527×407)				
11.81×14.88×11.61 (300×378×295)				
11.81×19.41×11.61 (300×493×295)				
19.69×19.69×13.39 (500×500×340)				
19.69×24.21×13.39 (500×615×340)				

Susol			
UAH-□□G			
32	40	50	60
3200	4000	5000	6000
1600	2000	2500	3000
2000	2500	3000	3200
2500	3000	3200	3600
3000	3200	3600	4000
3200	3600	4000	5000
	4000	5000	6000
254V/508V/635V			
50/60			
3P/4P			
N, A, P, S (4 type)			
100			
130			
130			
100			
100			
100			
100			
50ms			
90ms			
10,000		10,000	
-		-	
1,000		1,000	
-		-	
489 (222)		709 (321)	
626 (284)		919 (417)	
276 (125)		482 (218)	
355 (161)		630 (286)	
227 (103)		433 (196)	
287 (130)		561 (255)	
18.11×30.91×16.02 (460×785×407)			
18.11×39.96×16.02 (460×1015×407)			
11.81×29.57×11.61 (300×751×295)			
11.81×38.62×11.61 (300×981×295)			
31.5×32.48×13.39 (800×825×340)			
31.5×41.54×13.39 (800×1055×340)			

Trip relay(OCR)

The trip relay of Susol ACB provides the additional protection functions for voltage, frequency, unbalance, and others in addition to main protection functions for over current, short-circuit, ground fault. It supports the advanced measurement functions for voltage, current, power, electric energy, harmonics, communication function, and others.

Analog trip function interlocked with mechanism enhances the durability as well as the breaking capacity of the ACB.

Zone selective interlocking function makes the protective coordination more simple and thermal memory can be applied to various loads.







Contents

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N type: 「Normal」 type	26
A type: 「Ammeter」 type	28
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Trip relays

Susol

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	• L / S / I / G	• L / S / I / G(or Earth leakage) • Thermal • ZSI(Protective coordination) • ERMS	• L / S / I / G(or Earth leakage) • Thermal(Continuous) • ZSI(Protective coordination) • ERMS	• L / S / I / G(or Earth leakage) • Thermal(Continuous) • ZSI(Protective coordination) • ERMS
Other protection	-	• Earth leakage (Option)	• Earth leakage(Option) • Over/Under voltage • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• Earth leakage(Option) • Over/Under voltage • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power
Measurement function	-	• Current (R / S / T / N)	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand • Voltage/Current harmonics (1st-63th) • 3 Phase Waveforms • THD, TDD, K-Factor
Fine adjustment	-	-	• Fine adjustment for long/short time delay/instantaneous/ ground	• Fine adjustment for long/short time delay/instantaneous/ ground
Pre Trip Alarm	-	-	• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)	• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)
Digital Output	-	• 3DO (Fixed) • L, S/I, G Alarm	• 3DO (Programmable) • Trip, Alarm, General	• 3DO (Programmable) • Trip, Alarm, General
IDMTL setting	-	-	• Compliance with IEC60255-3 SIT, VIT, EIT, DT	• Compliance with IEC60255-3 SIT, VIT, EIT, DT
Communication	-	• Modbus/RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP
Power supply	• Self Power - Power source works over 20% of load current.	• Self Power - Power source works over 20% of load current. - External power source are required for comm. • AC/DC 100~250V • DC 15~60V	• AC/DC 100~250V • DC 15~60V	• AC/DC 100~250V • DC 15~60V
RTC timer	-	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault
Fault recording	-	• 10 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)	• 256 records • Last fault wave recording (voltage, current are recorded in 3-phase, and can be read only by communication)
Event recording	-	-	• 256 records(Content, Status, Date)	• 256 records(Content, Status, Date)
Operating button	• Reset button	• Reset, Menu Up/Down, Tap, Enter	• Reset, Menu Up/Down, Tap, Enter	• Reset, Menu Up/Down, Tap, Enter

Each OCR type has Battery in itself.

1. Battery lifespan

- 1) When turned off: 14~28years
- 2) When using 1 LED consecutively or turned off: 7~14days

2. The display minimum range of OCR current

- 1) A type: When more 15% than rated current (In)
- 2) P/S type: When more 12% than rated current (In)

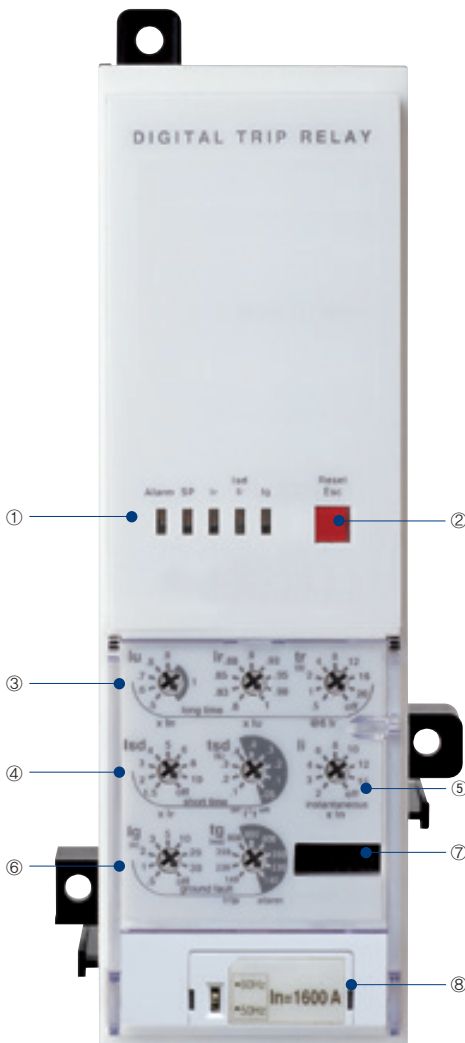
* L/S/I/G(or Earth leakage) configuration as standard
Unable to select ground fault and earth leakage simultaneously

Trip relays

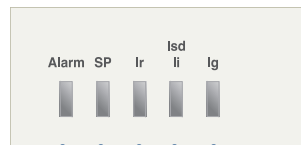
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N type: 「Normal」 type

- Optimized protection function
- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Self-Power



① LED: Indication of trip info. and overload state



- Ig: LED indicating ground-fault
- Isd/Ii: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- SP: Self-protection and battery test LED
- Alarm: LED indicating an overload
(Turn on above 90%, Blink above 105%)

② Reset Key: Fault reset or battery check

③ Iu, Ir: Long-time current setting, tr: Long-time tripping delay setting

④ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑤ Ii: Instantaneous current setting

⑥ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

⑦ Test terminal: OCR test terminal (Connected with OCR tester)

⑧ Rating plug

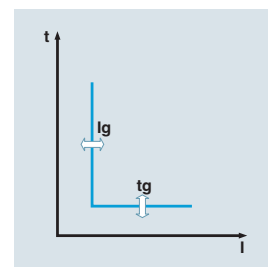
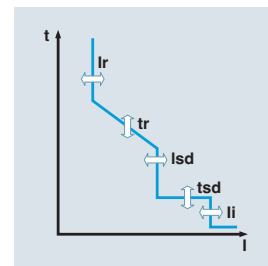
- Rated current setting (45~100% of the AF)
- Frequency selectable(60Hz/50Hz)

Trip relays

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Protection

Long time										
Current setting (A)	$I_u = I_n \times \dots$	0.5	0.6	0.7	0.8	0.9	1.0			
	$I_r = I_u \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off
Accuracy: $\pm 15\%$ or below 100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off
Short time										
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off
Time delay (s)	t_{sd}	$I^2 t$ Off	0.05	0.1	0.2	0.3	0.4			
		$I^2 t$ On $@(10 \times I_r)$	0.1	0.2	0.3	0.4				
Accuracy: $\pm 10\%$ or below 50ms	$(I^2 t \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			
		Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			
Instantaneous										
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								
Ground fault										
Pick-up (A)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s)	t_g	$I^2 t$ Off	0.05	0.1	0.2	0.3	0.4			
		$I^2 t$ On $@(1 \times I_n)$	0.1	0.2	0.3	0.4				
Accuracy: $\pm 10\%$ ($I_g \geq 0.4 I_n$) $\pm 20%$ ($I_g < 0.4 I_n$) or below 50ms	$(I^2 t \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			
		Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			

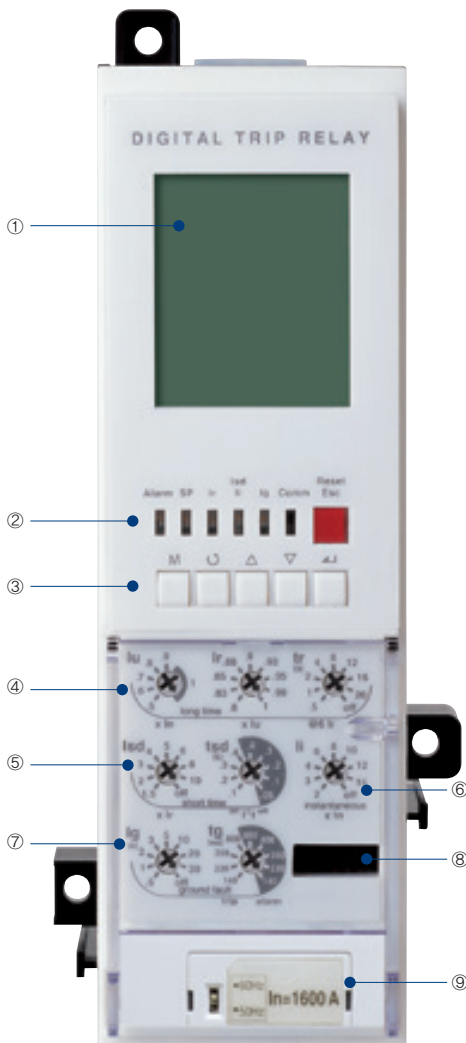


Trip relays

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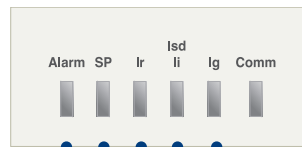
A type: 「Ammeter」 type

- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
 - Trip/Alarm selectable (need external power)
 - Blocking Time (0-60s)
 - Does not detect ground fault during Blocking time.
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
 - Disable/Enable Selectable
- High-performance and high-speed MCU built-in
 - Accurate measurement with tolerance of 1.0%
- Measurement and Display Function
 - High detailed measurement for current
 - character LCD type
- Fault recording
 - Records Max. up to 10 fault information about fault type, fault phase, fault data, occurrence time of fault
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- 3 DO(Digital Output)
 - Fixed
- Communication
 - Modbus/RS485
 - Profibus-DP
- ERMS
 - Arc Flash Reduction
 - Instantaneous setting value is minimized. (2*In)



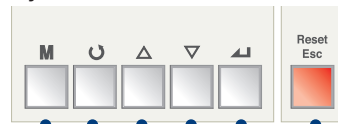
① LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



- Ig: LED indicating ground-fault
- Isd/Ii: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- SP: Self-protection and battery test LED
- Alarm: LED indicating an overload (Turn on above 90%, blinks above 105%)

③ Key: Move to menu or reset



- Reset/ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up/Down: Move the cursor up/down on screen or increase/decrease a setting value
- Right/Left: Move the cursor or setting right/left on screen (Rotation)
- Menu: Menu display ↔ Measurement display

④ Iu, Ir: Long-time current setting, tr: Long-time tripping delay setting

⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑥ Ii: Instantaneous current setting

⑦ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

⑨ Rating plug

- Rated current setting (45~100% of the AF)
- Frequency selectable(60Hz/50Hz)

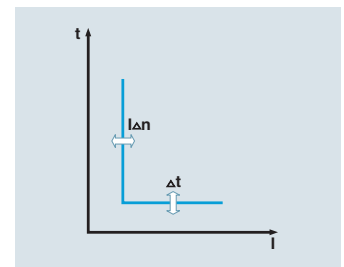
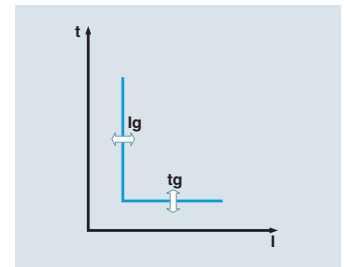
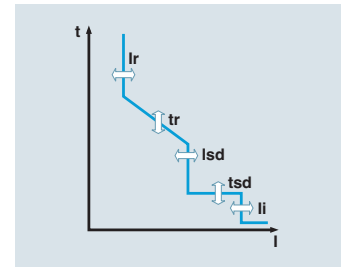
Trip relays

Susol

Protection

Long time											
Current setting (A)	$I_u = I_n \times \dots$	0.5	0.6	0.7	0.8	0.9	1.0				
	$I_r = I_u \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0	
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off	
Accuracy: $\pm 15\%$ or below 100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off	
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off	
Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Of	
Time delay (s)	t_{sd}	$I^2 t$ Off	0.05	0.1	0.2	0.3	0.4				
		$I^2 t$ On @ $(10 \times I_r)$	0.1	0.2	0.3	0.4					
Accuracy: $\pm 10\%$ or below 50ms	$(I^2 t \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				
Instantaneous											
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off	
Tripping time		below 50ms									
Ground fault											
Pick-up (A)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
Time delay (s)	t_g	$I^2 t$ Off	0.05	0.1	0.2	0.3	0.4				
		$I^2 t$ On @ $(1 \times I_n)$	0.1	0.2	0.3	0.4					
Accuracy: $\pm 10\%$ ($I_g \geq 0.4 I_n$) $\pm 20%$ ($I_g < 0.4 I_n$) or below 50ms	$(I^2 t \text{ Off})$	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				
Earth leakage (Option)											
Current setting (A)	$I_{\Delta n}$	0.5	1	2	3	5	10	20	30	Off	
Time delay (ms)	Δt	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

Note) Current setting values are secondary current of the external CT.
Recommended not to use current setting values more than 5A.

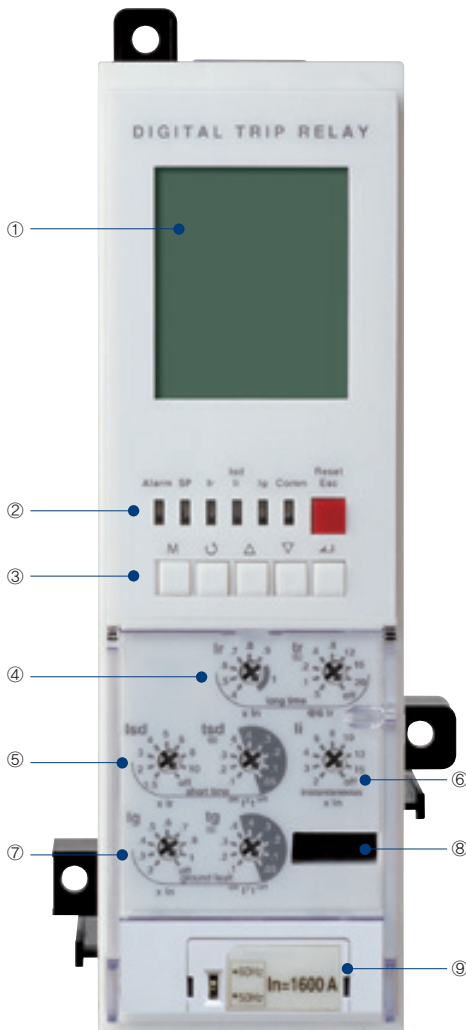


Trip relays

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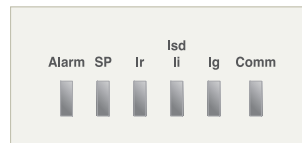
P type: 「Power meter」 type

- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
 - Trip/Alarm selectable (need external power)
 - Blocking Time (0~60s)
 - Do not ground fault detect during Blocking time
- Protection for Over voltage/Under voltage/Over frequency/Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
 - Disable/Enable Selectable
- Fine-adjustable setting by knob and key
- ERMS
 - Arc Flash Reduction
 - Instantaneous setting value is minimized. (2*I_n)
- IDMTL setting (SIT, VIT, EIT, DT curve)
 - Basic setting : "None". Thermal curve.
- Measurement and Display Function
 - High detailed measurement for 3 phase current/Voltage/Power/Energy/Phase angle/Frequency/PF/Demand
 - 128 x 128 Graphic LCD
 - Indicates current/voltage Vector Diagram and Waveform
- Fault recording
 - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
- Event recording
 - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- 3 DO(Digital output)
 - Programmable for alarm, trip and general DO
- Communication
 - Modbus/RS485
 - Profibus-DP



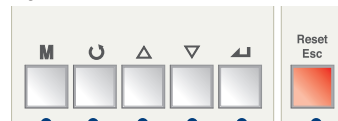
① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



- Comm: LED indicating comm. state (Blinks when running)
- Ig: LED indicating ground-fault
- Isd/Ii: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- SP: Self-protection and battery test LED
- Alarm: LED indicating an overload (Turns on above 90%, blinks above 105%)

③ Key: Move to menu or reset



- Reset/ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up/Down: Move the cursor up/down on screen or increase/decrease a setting value
- Right/Left: Move the cursor or setting right/left on screen (Rotation)
- Menu: Menu display ↔ Measurement display

④ Ir: Long-time current setting, tr: Long-time tripping delay setting

⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑥ Ii: Instantaneous current setting

⑦ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

⑨ Rating plug

- Rated current setting (45~100% of the AF)
- Frequency selectable(60Hz/50Hz)

Trip relays

Susol

Protection

Long time										
Current setting (A)	$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off
Accuracy: $\pm 15\%$ or below 100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off

Short time										
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off
Time delay (s) Accuracy: $\pm 10\%$ or below 50ms	t_{sd}	I^2t Off	0.05	0.1	0.2	0.3	0.4			
		I^2t On @ $(10 \times I_r)$	0.1	0.2	0.3	0.4				
	$(I^2t$ Off)	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			

Instantaneous										
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								

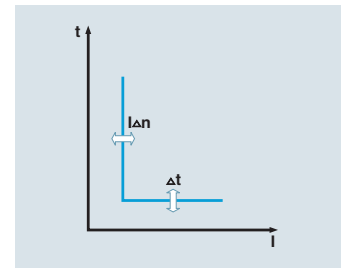
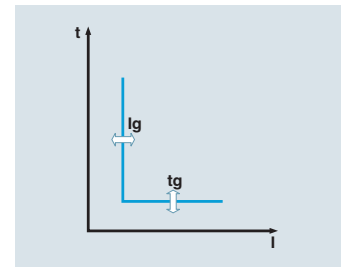
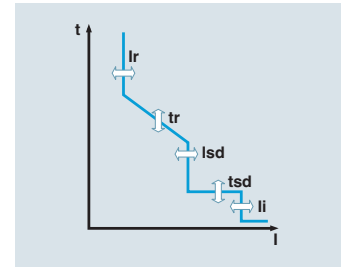
Ground fault										
Pick-up (A)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s) Accuracy: $\pm 10\%$ ($I_g \geq 0.4 I_n$) $\pm 20\%$ ($I_g < 0.4 I_n$) or below 50ms	t_g	I^2t Off	0.05	0.1	0.2	0.3	0.4			
		I^2t On @ $(1 \times I_n)$	0.1	0.2	0.3	0.4				
	$(I^2t$ Off)	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			

Earth leakage (Option)										
Current setting (A)	$I_{\Delta n}$	0.5	1	2	3	5	10	20	30	Off
Time delay (ms) Accuracy: $\pm 15\%$	Δt	Alarm Time(ms)	140	230	350	800	950			
		Trip Time(ms)	140	230	350	800				

Note) Current setting values are secondary current of the external CT.
Recommended not to use current setting values more than 5A.

PTA(Pre Trip Alarm)										
Current setting (A)	$I_p = I_r \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
Time delay (s)	$t_p @ (1.2 \times I_p)$	1	5	10	15	20	25	30	35	Off
Accuracy: $\pm 15\%$										

Other protection	Pick-up			Time delay(s)		
	Setting range	Step	Accuracy	Setting range	Step	Accuracy
Under voltage	80V ~ 0V_Pick-up	1V	$\pm 5\%$	1.2~40sec	0.1sec	$\pm 0.1sec$
Over voltage	UV_Pick-up ~ 980V	1V	$\pm 5\%$			
Voltage unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or $(*\pm 10\%)$			
Reverse power	10~500 kW	1kW	$\pm 10\%$			
Over power	500~5000 kW	1kW	$\pm 10\%$			
Current unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or $(*\pm 10\%)$			
Over frequency	60Hz UF_Pick-up ~ 65	1Hz	$\pm 0.1Hz$	1.2~40sec		
	50Hz UF_Pick-up ~ 55	1Hz	$\pm 0.1Hz$			
Under frequency	60Hz 55Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$			
	50Hz 45Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$			

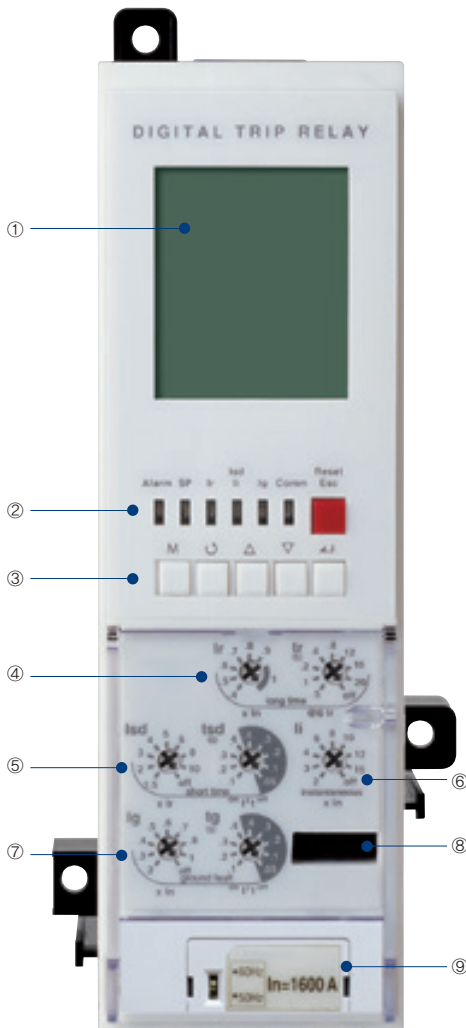


Trip relays

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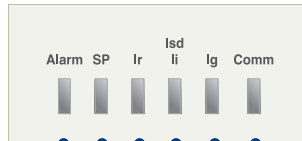
S type: 「Supreme meter」 type

- Overload protection
 - Long-time delay
 - Thermal
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
 - Trip/Alarm selectable (need external power)
 - Blocking Time (0~60s)
 - Do not ground fault detect during Blocking time
- Protection for Over voltage/Under voltage/Over frequency/Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
 - Disable/Enable
- Fine-adjustable setting by knob and Key
- IDMTL setting (SIT, VIT, EIT, DT curve)
 - Basic setting : "None". Thermal curve.
- ERMS
 - Arc Flash Reduction
 - Instantaneous setting value is minimized. (2*I_n)
- Measurement and Display Function
 - High detailed measurement for 3 phase current/Voltage/Power/Energy/Phase angle/Frequency/PF/Demand
 - 128 x 128 Graphic LCD
 - Indicates current/voltage Vector Diagram and Waveform
- Fault recording
 - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
 - Fault wave recording: records the latest fault wave
- Event recording
 - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- Power quality analysis
 - Measurement for 1st~63th harmonics
 - THD, TDD, k-Factor
 - Voltage/current waveform capture
- 3 DO(Digital output)
 - Programmable for alarm, trip and general DO
- Communication
 - Modbus/RS485
 - Profibus-DP



① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



- Comm: LED indicating comm. state (Blinks when running)
- Ig: LED indicating ground-fault
- Isd/li: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- SP: Self-protection LED and battery test LED
- Alarm: LED indicating an overload (Turns on above 90%, blinks above 105%)

③ Key: Move to menu or reset



- Reset/ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up/Down: Move the cursor up/down on screen or increase/decrease a setting value
- Right/Left: Move the cursor or setting right/left on screen (Rotation)
- Menu: Menu display ↔ Measurement display

④ Ir: Long-time current setting, tr: Long-time tripping delay setting

⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑥ li: Instantaneous current setting

⑦ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

⑨ Rating plug

- Rated current setting (45~100% of the AF)
- Frequency selectable(60Hz/50Hz)

Trip relays

Susol

Protection

Long time										
Current setting (A)	$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	1.0		
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off
Accuracy: $\pm 15\%$ or below 100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off

Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Time delay (s) Accuracy: $\pm 10\%$ or below 50ms	t_{sd}	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On @ $(10 \times I_r)$	0.1	0.2	0.3	0.4					
	$(I^2t$ Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

Instantaneous										
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								

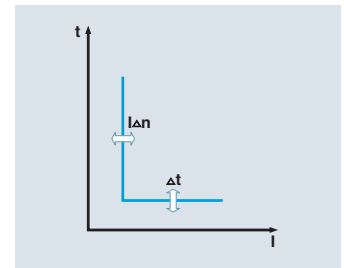
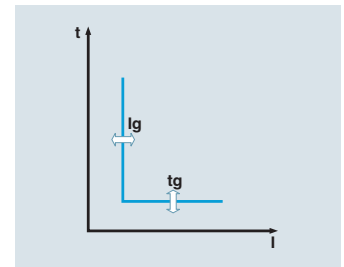
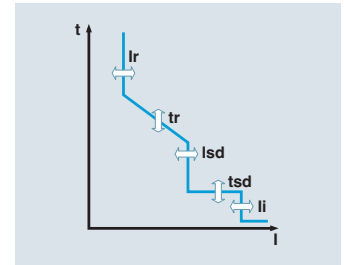
Ground fault											
Pick-up (A)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
Time delay (s) Accuracy: $\pm 10\%$ ($I_g \geq 0.4 I_n$) $\pm 20\%$ ($I_g < 0.4 I_n$) or below 50ms	t_g	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On @ $(1 \times I_n)$	0.1	0.2	0.3	0.4					
	$(I^2t$ Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

Earth leakage (Option)											
Current setting (A)	$I_{\Delta n}$	0.5	1	2	3	5	10	20	30	Off	
Time delay (ms) Accuracy: $\pm 15\%$	Δt	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

Note) Current setting values are secondary current of the external CT.
Recommended not to use current setting values more than 5A.

PTA(Pre Trip Alarm)										
Current setting (A)	$I_p = I_r \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
Time delay (s)	$t_p @ (1.2 \times I_p)$	1	5	10	15	20	25	30	35	Off
Accuracy: $\pm 15\%$										

Other protection	Pick-up			Time delay(s)		
	Setting range	Step	Accuracy	Setting range	Step	Accuracy
Under voltage	80V ~ 0V_Pick-up	1V	$\pm 5\%$	1.2~40sec	0.1sec	$\pm 0.1sec$
Over voltage	UV_Pick-up ~ 980V	1V	$\pm 5\%$			
Voltage unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or $(*\pm 10\%)$			
Reverse power	10~500 kW	1kW	$\pm 10\%$			
Over power	500~5000 kW	1kW	$\pm 10\%$			
Current unbalance	6% ~ 99%	1%	$\pm 2.5\%$ or $(*\pm 10\%)$			
Over frequency	60Hz	UF_Pick-up ~ 65	1Hz	$\pm 0.1Hz$	1.2~40sec	
	50Hz	UF_Pick-up ~ 55	1Hz	$\pm 0.1Hz$		
Under frequency	60Hz	55Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$		
	50Hz	45Hz ~ OF_Pick-up	1Hz	$\pm 0.1Hz$		



Trip relays

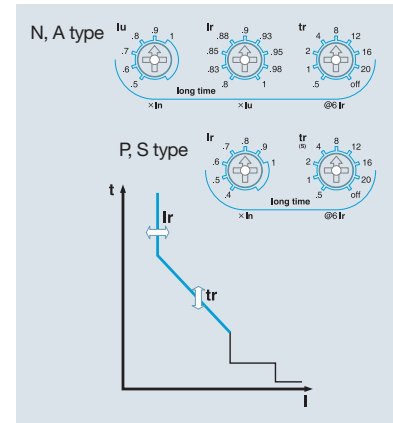
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Operation characteristics

Long-time delay (L)

The function for overload protection which has time delayed characteristic in inverse ratio to fault current.

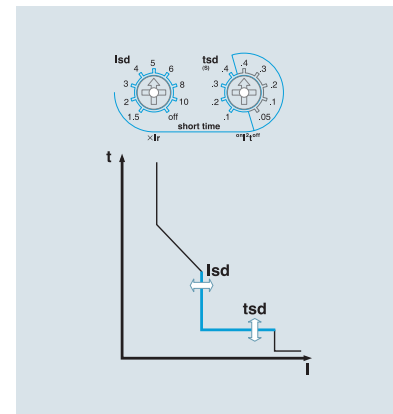
- Standard current setting knob: Ir
 - 1) Setting range in P type and S type: $(0.4-0.5-0.6-0.7-0.8-0.9-1.0) \times I_n$
 - 2) Setting range in N type and A type: $(0.4 \sim 1.0) \times I_n$
 - Iu: $(0.5-0.6-0.7-0.8-0.9-1.0) \times I_n$
 - Ir: $(0.8-0.83-0.85-0.88-0.9-0.93-0.95-0.98-1.0) \times I_u$
- Time delay setting knob: tr
 - Standard operating time is based on the time of $6 \times I_r$
 - Setting range: 0.5-1-2-4-8-12-16-20-Off sec (9 modes)
- Relay pick-up current
 - When current over $(1.15) \times I_r$ flows in, relay is picked up.
- Relay operates basing on the largest load current among R/S/T/N phase.



Short-time delay (S)

The function for fault current (over current) protection which has definite time characteristic and time delayed in inverse ratio to fault current.

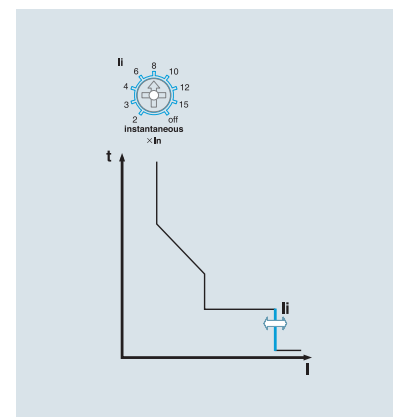
- Standard current setting knob: Isd
 - Setting range: $(1.5-2-3-4-5-6-8-10-Off) \times I_r$
- Time delay setting knob: tsd
 - Standard operating time is based on the time of $10 \times I_r$.
 - Inverse time (I^2t On): 0.1-0.2-0.3-0.4 sec
 - Definite time (I^2t Off): 0.05-0.1-0.2-0.3-0.4 sec
- Relay operates basing on the largest load current among R/S/T/N phase.
- When ZSI function is set, the protection operation will take place instantaneously with input absence by downstream devices. It is advised to disable its ZSI function on the last downstream device.



Instantaneous (I)

The function for breaking fault current above the setting value within the shortest time to protect the circuit from short-circuit.

- Standard current setting knob: Ii
 - Setting range: $(2-3-4-6-8-10-12-15-Off) \times I_n$
- Relay operates basing on the largest load current among R/S/T/N phase.
- Total breaking time is below 50ms.
- When using the ERMS function, Instantaneous setting value is applied as $2 \times I_n$ (N type OCR does not apply)



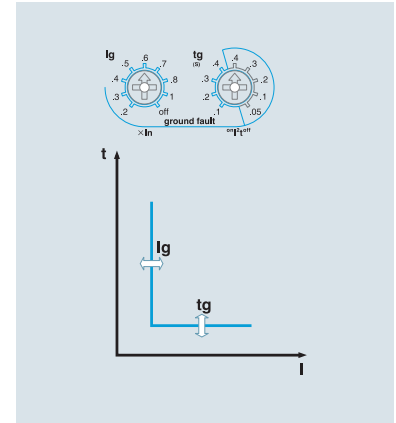
Trip relays

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Ground Fault (G)

The function for breaking ground fault current above setting value after time-delay to protect the circuit from ground fault.

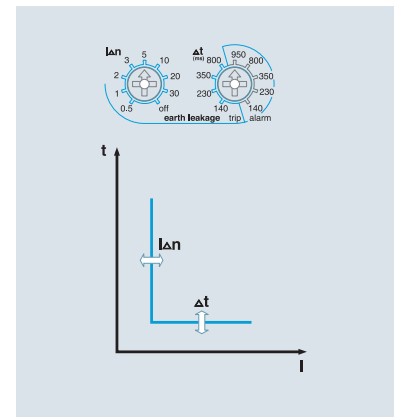
- Standard setting current knob: I_g
 - Setting range: $(0.2-0.3-0.4-0.5-0.6-0.7-0.8-1.0-Off) \times I_n$
- Time delay setting knob: t_g
 - Inverse time (I^2t On): 0.1-0.2-0.3-0.4 sec
 - Definite time (I^2t Off): 0.05-0.1-0.2-0.3-0.4 sec
- Ground fault current is vector sum of each phase current. Therefore, 3Pole products may operate under its phase-unbalance including ground fault situations. $(R+S+T+(N))$ Phase
- When ZSI function is set, the protection operation will take place instantaneously with input absence by downstream devices. It is advised to disable its ZSI function on the last downstream device.
- Ground-fault functions are basically provided with products equipped with a trip relay through its internal CT that is embedded in each phase. (But, it can't be used with earth-leakage protection function at the same time)



Earth Leakage (G) - Option

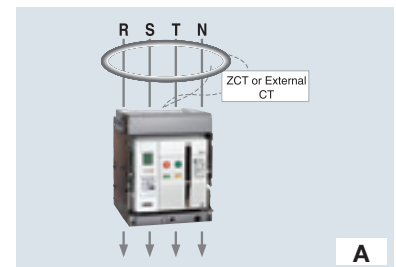
The function for breaking earth leakage current above setting value after time delay to protect the circuit from earth leakage. (A, P, S type)

- Standard setting current knob: $I_{\Delta n}$
 - Setting range: 0.5-1-2-3-5-10-20-30-Off (A)
- Time delay setting knob: Δt
 - Trip time: 140-230-350-800 ms
 - Alarm time: 140-230-350-800-950 ms
- Setting values within the alarm range will not trip the breaker but will activate its alarm.
- This function is enabled and can be used only with private external CT (secondary output 5A) selected by customers.
- When ZSI function is set, the protection operation will take place instantaneously with input absence by downstream devices. It is advised to disable its ZSI function on the last downstream device.



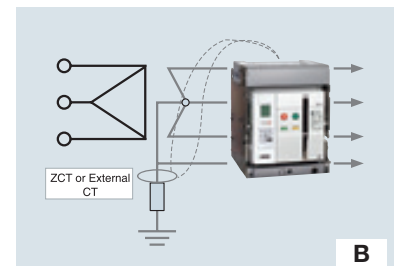
※ Use cautions with earth-leakage current settings

- When using ZCT provided by customers, the setting range should be from 0.5 to 5A based on its secondary current. (Secondary output rating : 5A)
Hence, under 100:5A CT, if trip relay is set to 0.5A, earth-leakage exceeding 10A will activate its operation ($0.5A \times 20 = 10A$)



※ Guideline for external CT usage

- Earth-leakage protection characteristics using the standard CT that is installed inside the ACB can protect currents from 20 to 100% range on its rated current.
- As rated currents on ACB increases, current that is covered by its standard CT increase as well. This can not protect against small leakage currents.
ex) 400A ACB Min. Earth-leakage current $400A \times 20\% = 80A$
4000A ACB Min. Earth-leakage current $4000A \times 20\% = 800A$
- Therefore, customers are advised to install an external CT in accordance with its rated currents within its systems. And choose trip relay (E, X type) which is required with external CT usage in order to provide earth-leakage functions.



Trip relays

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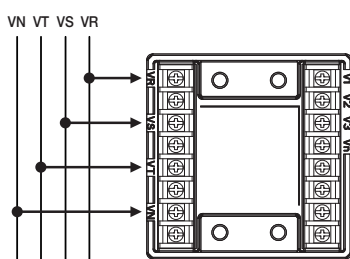
Measurement function

Class.	Measurement element	Detailed element	Unit	Display range	Accuracy
Current	Line current	Ia,Ib,Ic	A	A type: 0.15In~17In P/S type: 0.12In~1.6In	±3%
	Normal current	I ₁			
	Reverse current	I ₂			
Voltage	Line voltage	Vab,Vbc,Vca	V	60~690V	±1%
	Phase voltage	Va,Vb,Vc			±1%
	Normal voltage	V ₁			
	Reverse voltage	V ₂			
Angle	Line-to-line	∠VabIa, ∠VablIb, ∠VabIc,	°	0~360°	±1°
	Line-to-current	∠VabVbc, ∠VabVca			±1°
	Phase-to-phase	∠VaVb, ∠VaVc			±1°
	Phase-to-current	∠VaIa, ∠VbIb, ∠VcIc			±1°
Power	Active power	Pa(ab), Pb(bc), Pc(ca), P	kW	1kW~99,999kW	±3%
	Reactive power	Qa(ab), Qb(bc), Qc(ca), Q	kVar	1kVar~99,999kVar	±3%
	Apparent power	Sa(ab), Sb(bc), Sc(ca), S	kVA	1kVA~99,999kVA	±3%
Energy	Active energy	WHa(ab), WHb(bc), WHc(ca), WH	kWh MWh	1kWh~9999.99MWh	±3%
	Reactive energy	VARHa(ab), VARHb(bc), VARHc(ca), VARH	kVarh Mvarh	1kVarh~9999.99MVarh	±3%
	Reverse active energy	rWHa(ab), rWHb(bc), rWHc(ca), rWH	kWh MWh	1kWh ~9999.99MWh	±3%
Freq.	Frequency	F	Hz	45~65Hz	
Power factor	Power factor(PF)	PFa(ab), PFb(bc), PFc(ca), PF		+: Lead, -: Lag	
Unbalance	Unbalance rate	Iunbalance, Vunbalance	%	0.0~100.0	
Demand	Active power demand	Peak demand	kW	1kW~99999kW	
	Current demand	Peak demand	A	80A~65,535A	
Harmonics	Voltage harmonics	1st~63th harmonics of Va(ab),Vb(bc),Vc(ca)	V	60~690V	
	Current harmonics	1st~63th harmonics of Ia,Ib,Ic	A	80A~65,535A	
	THD, TDD		%	0.0~100.0	
	K-Factor		-	0.0~100.0	

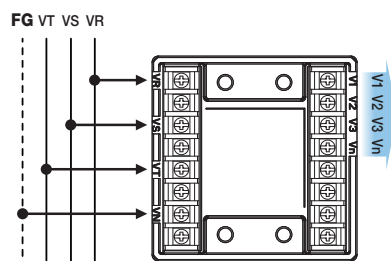
Voltage module

For P and S type trip relays, a separate voltage module is necessary to measure other elements beside the current. (Separate purchase necessary)

- Voltage input range: AC 60~690V
- Input/Output Ratio → 220V: 200mV



3P4W wiring



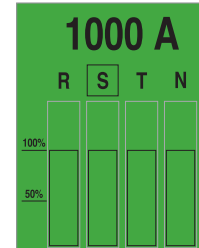
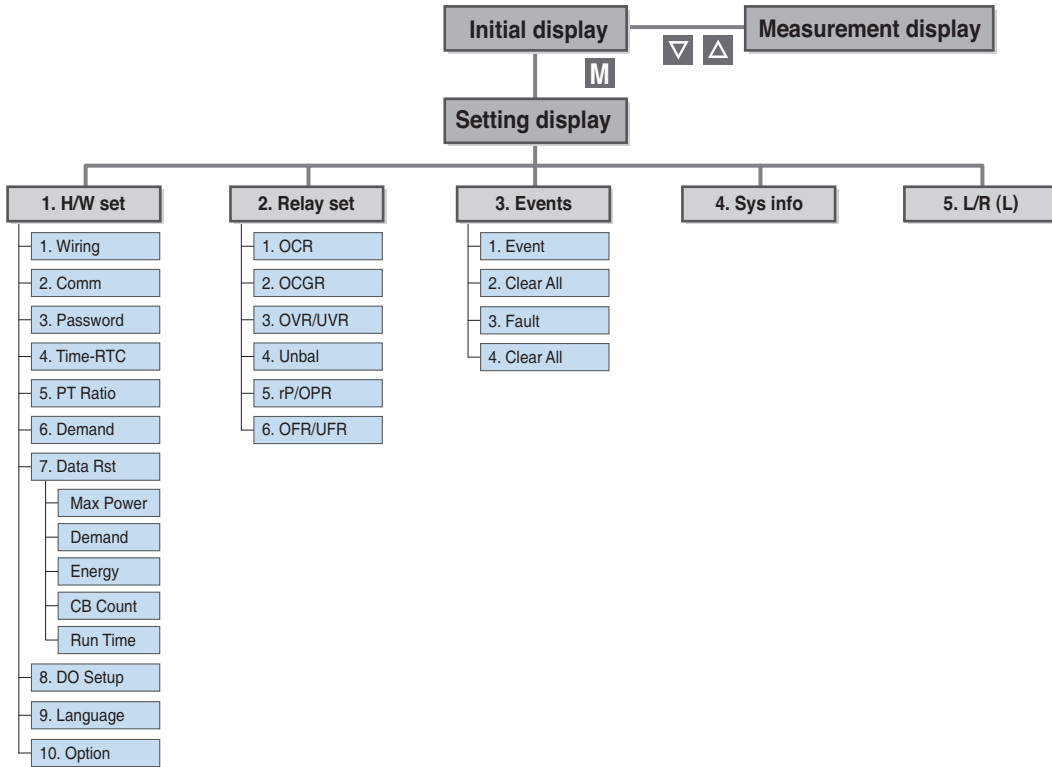
3P3W wiring



Trip relays

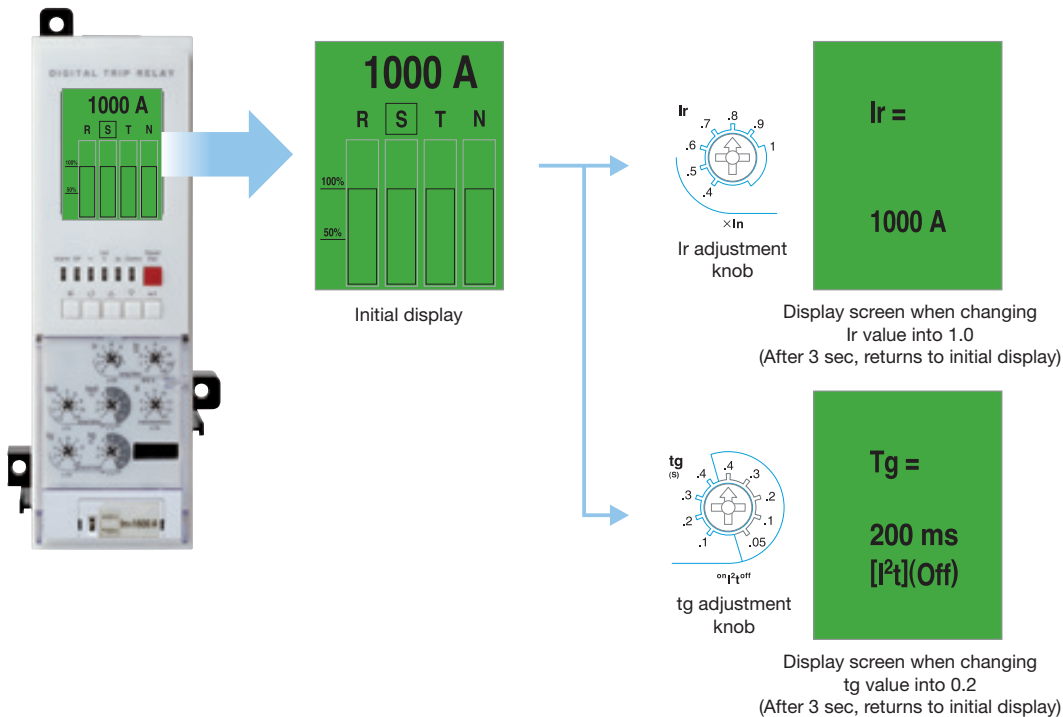
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Man machine interface



Initial display

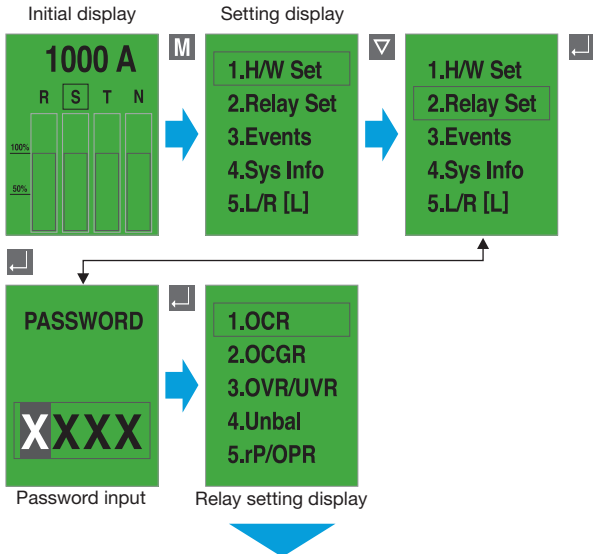
An example of graphic LCD display



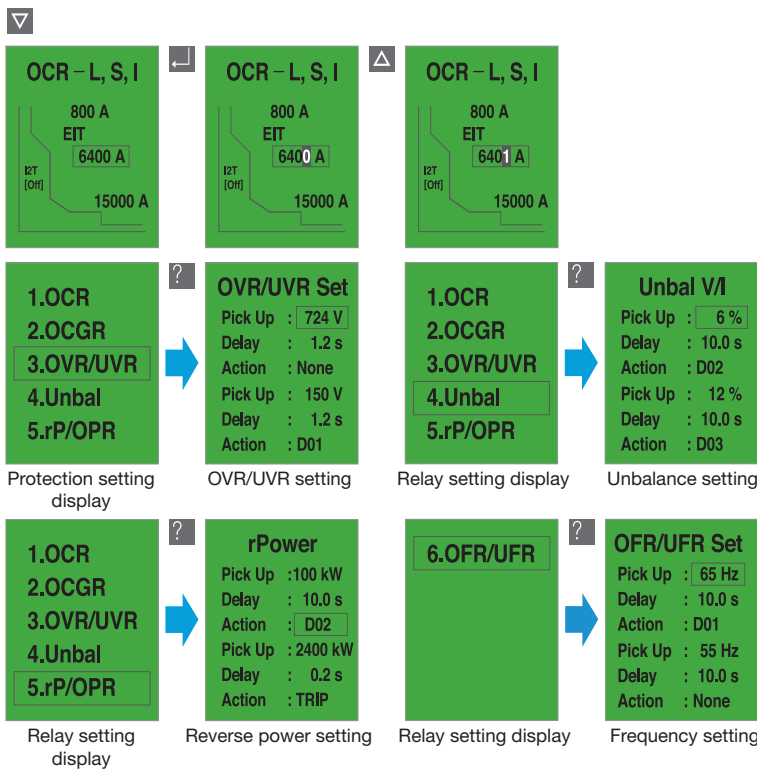
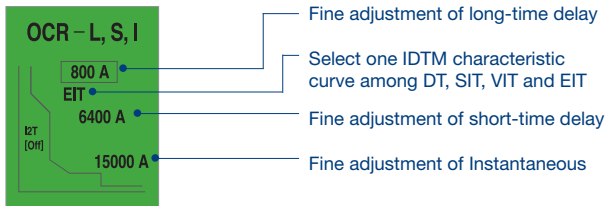
Trip relays

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Protection element setting



Fine adjustment of protection setting current



- OCR and OCGR's current setting is basically controlled by knob's setting values.
- The fine current that cannot be controlled by knob is adjustable by using ∇ , Δ key.
- Fine adjustment is only adjustable in the present knob and next knob's setting range, when moving knob, the adjusted data becomes reset state.

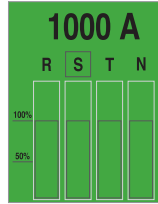
- The setting method of OCGR is same with OCR's, fine adjustment is available.

Trip relays

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Measurement element display

Load current



Measurement overview

Metering Overview VR 220 V ∠ 0.0 IR 1000 A ∠ 330.0 P 986 kW Q 589 kVar PF 0.866 F 60.0 EP 56 kWh EQ 32 kVarh	Demand Current [A] R : 1000 S : 1000 T : 1000 Max Demand [kW] 986 2007/05/14 11:15:00	Max Power [kW] 987 2007/05/14 10:00:00
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Voltage/Current vector diagram

Vector Diagram 	VOLTAGE [V] VR : 220 ∠ 0.0 VS : 220 ∠ 240.0 VT : 220 ∠ 120.0 CURRENT [A] IR : 1000 ∠ 330.0 IS : 1000 ∠ 210.0 IT : 1000 ∠ 90.0 IN : 0	V unbal 3Phase Vpos : 220 V Vneg : 0 V Unbal : 0.0 % I unbal 3Phase Ipos : 1000 A Ineg : 0 A Unbal : 0.0 %
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Power and power factor

Power Diagram 	Active Power [kW] R : 328 Total S : 328 986 T : 328 Reactive [kVar] R : 189 Total S : 189 589 T : 189	Apparent [kVA] R : 379 Total S : 379 1139 T : 379 Power Factor R : 0.87 Total S : 0.87 0.866 T : 0.87
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Energy

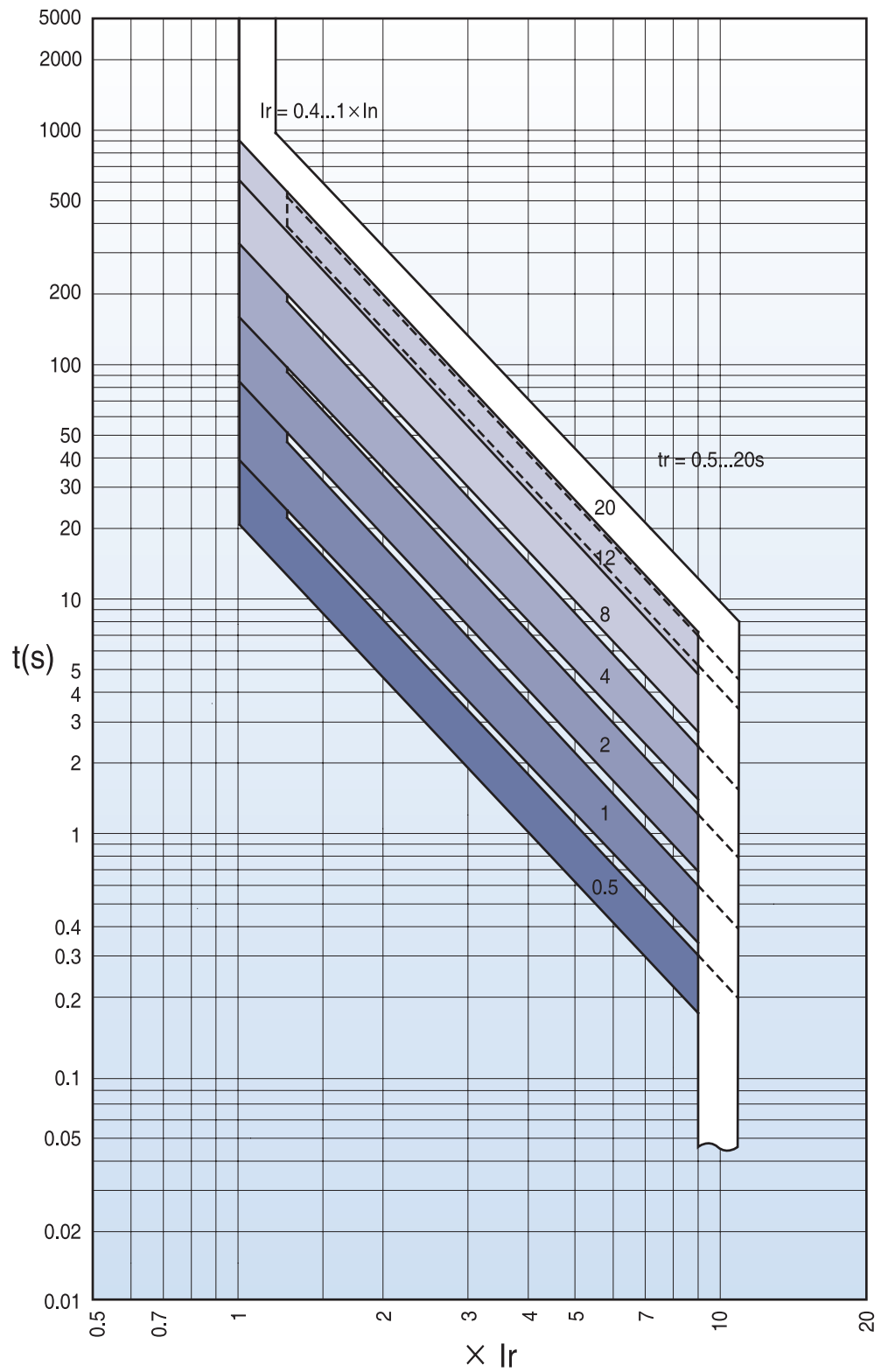
Forward Energy P+ 1051 kWh Q+ 607 kVarh Reverse Energy P- 0 kWh Q- 0 kVarh	Forward P [kWh] R : 360 Total S : 360 1080 T : 360 Forward Q [kVarh] R : 210 Total S : 210 630 T : 210	Reverse P [kWh] R : 0 Total S : 0 0 T : 0 Reverse Q [kVarh] R : 0 Total S : 0 0 T : 0
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Voltage/Current harmonics (S type)

Volt Wave & FFT [%] THD[S] : 25.0 	S Volt Harmonics [V] H1 220 H8 0 H2 0 H9 0 H3 55 H10 0 H4 0 H11 0 H5 0 H12 0 H6 0 H13 0 H7 0 H14 0	S Volt Harmonics [V] H15 0 H22 0 H16 0 H23 0 H17 55 H24 0 H18 0 H25 0 H19 0 H26 0 H20 0 H27 0 H21 0 H28 0	S Volt Harmonics [V] H57 0 H58 0 H59 0 H60 0 H61 0 H62 0 H63 0	
Curr Wave & FFT [%] THD[R] : 3.0 	R Curr Harmonics [A] H1 1000 H8 0 H2 0 H9 3 H3 15 H10 0 H4 0 H11 1 H5 20 H12 0 H6 0 H13 1 H7 0 H14 0	R Curr Harmonics [A] H15 1 H22 0 H16 0 H23 1 H17 1 H24 0 H18 0 H25 1 H19 1 H26 0 H20 0 H27 1 H21 1 H28 0	R Curr Harmonics [A] H57 0 H58 0 H59 0 H60 0 H61 0 H62 0 H63 0	TDD 3Phase R : 0.1 % S : 0.1 % T : 0.1 % Current K - Factor R : 1.2 S : 1.2 T : 1.3

Characteristics curves

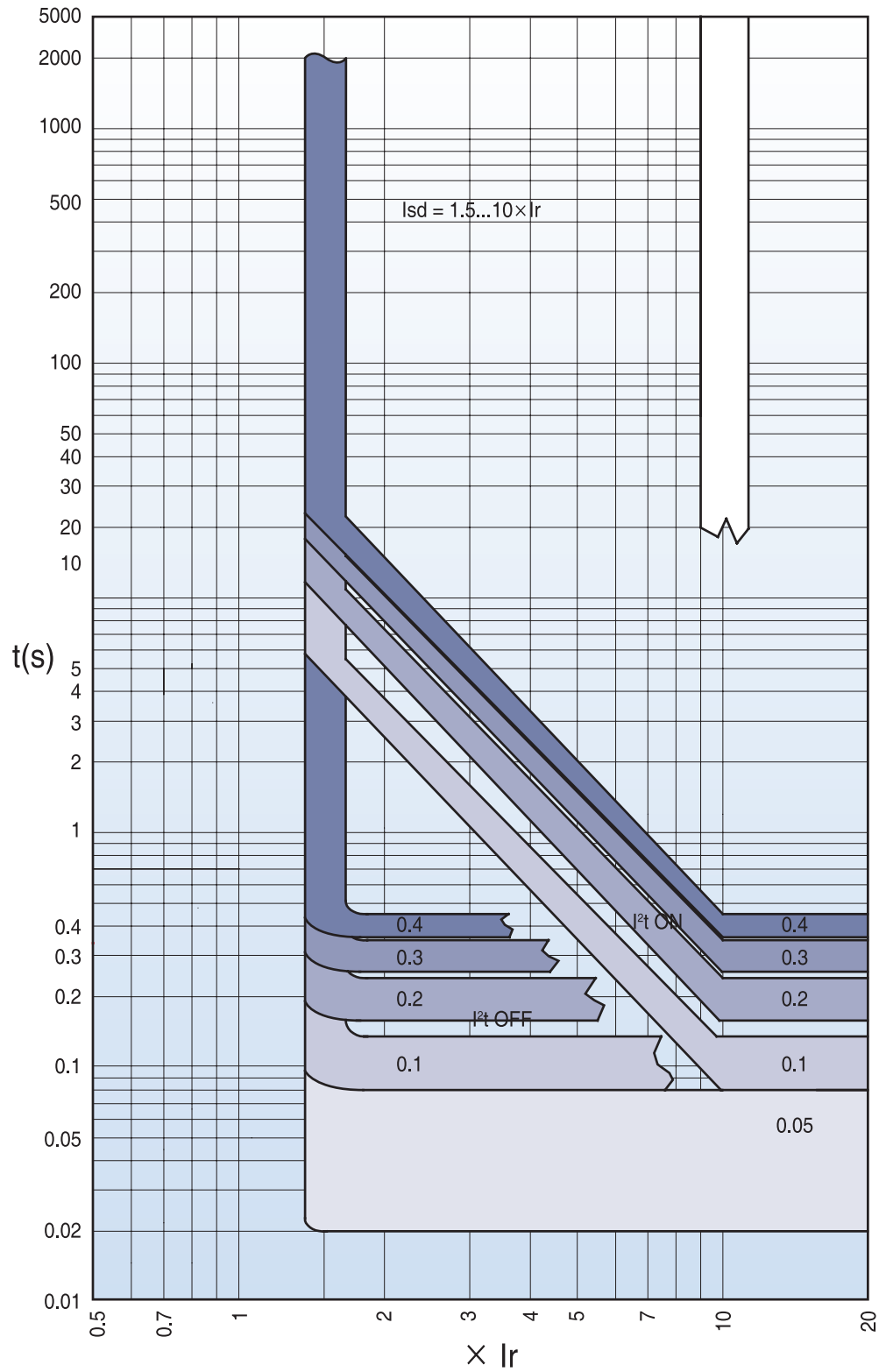
Long-time delay (L)



Trip relays

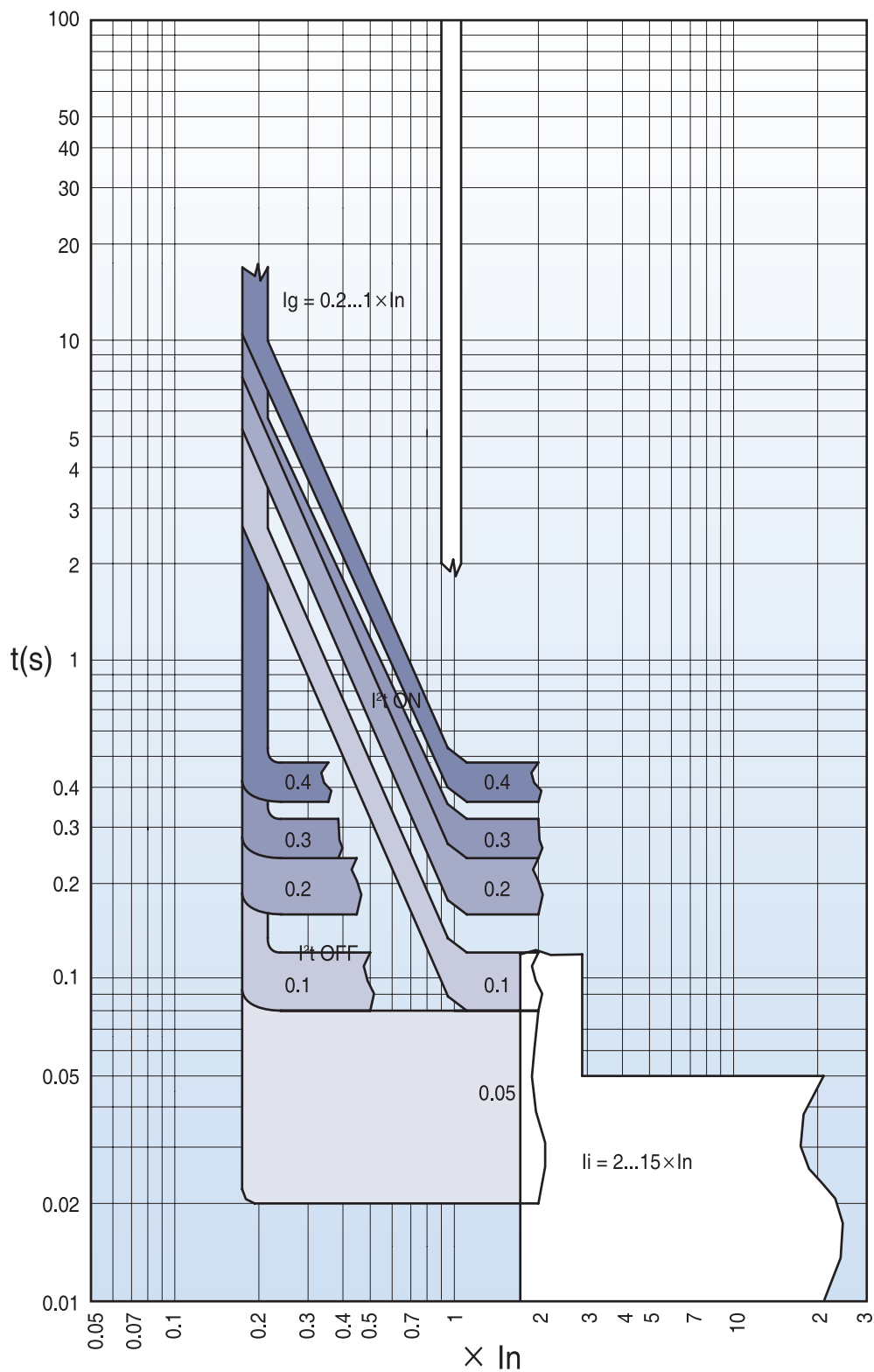
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Short-time delay (S)



Characteristics curves

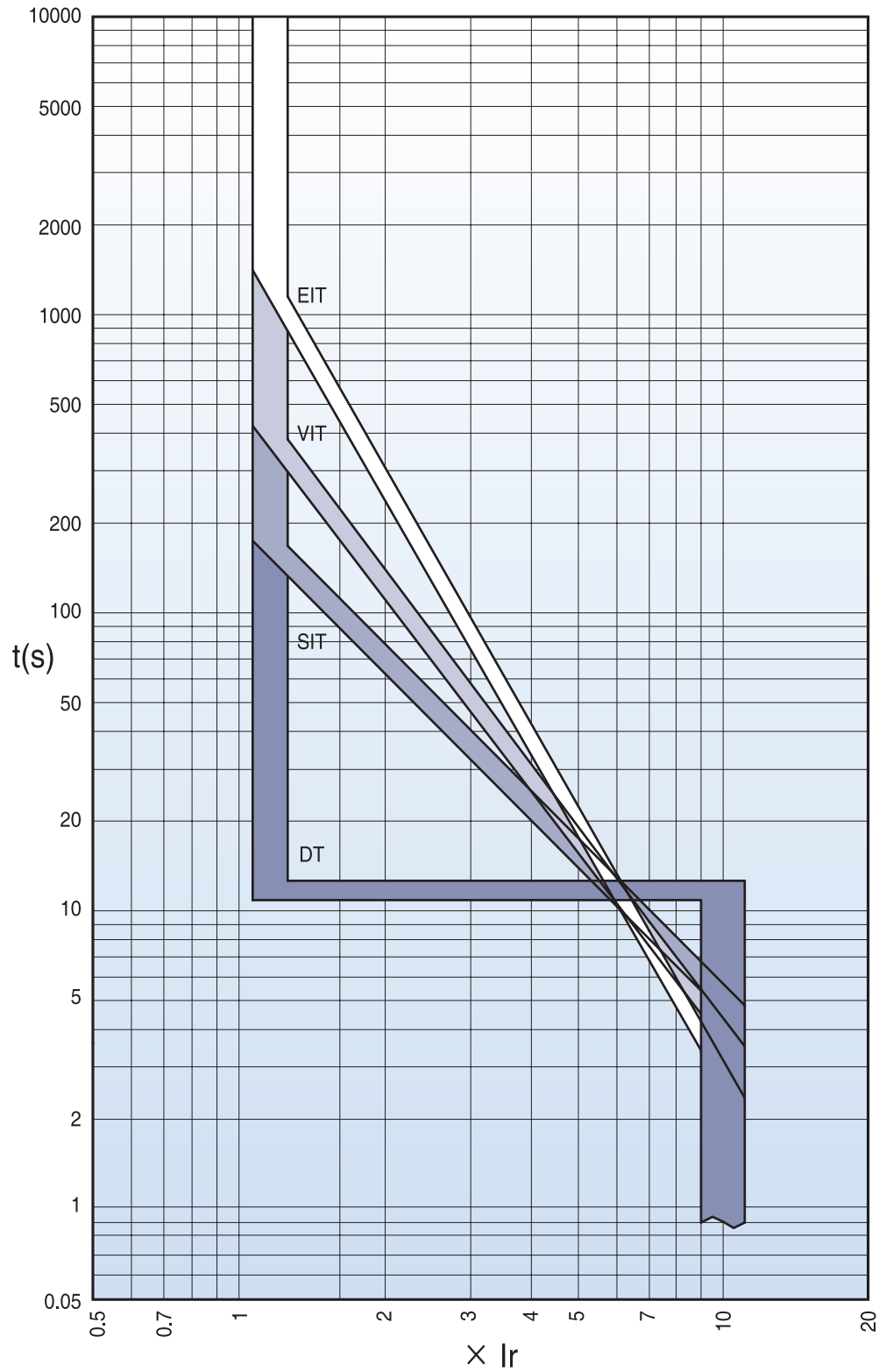
Instantaneous (I)
Ground fault (G)



Trip relays

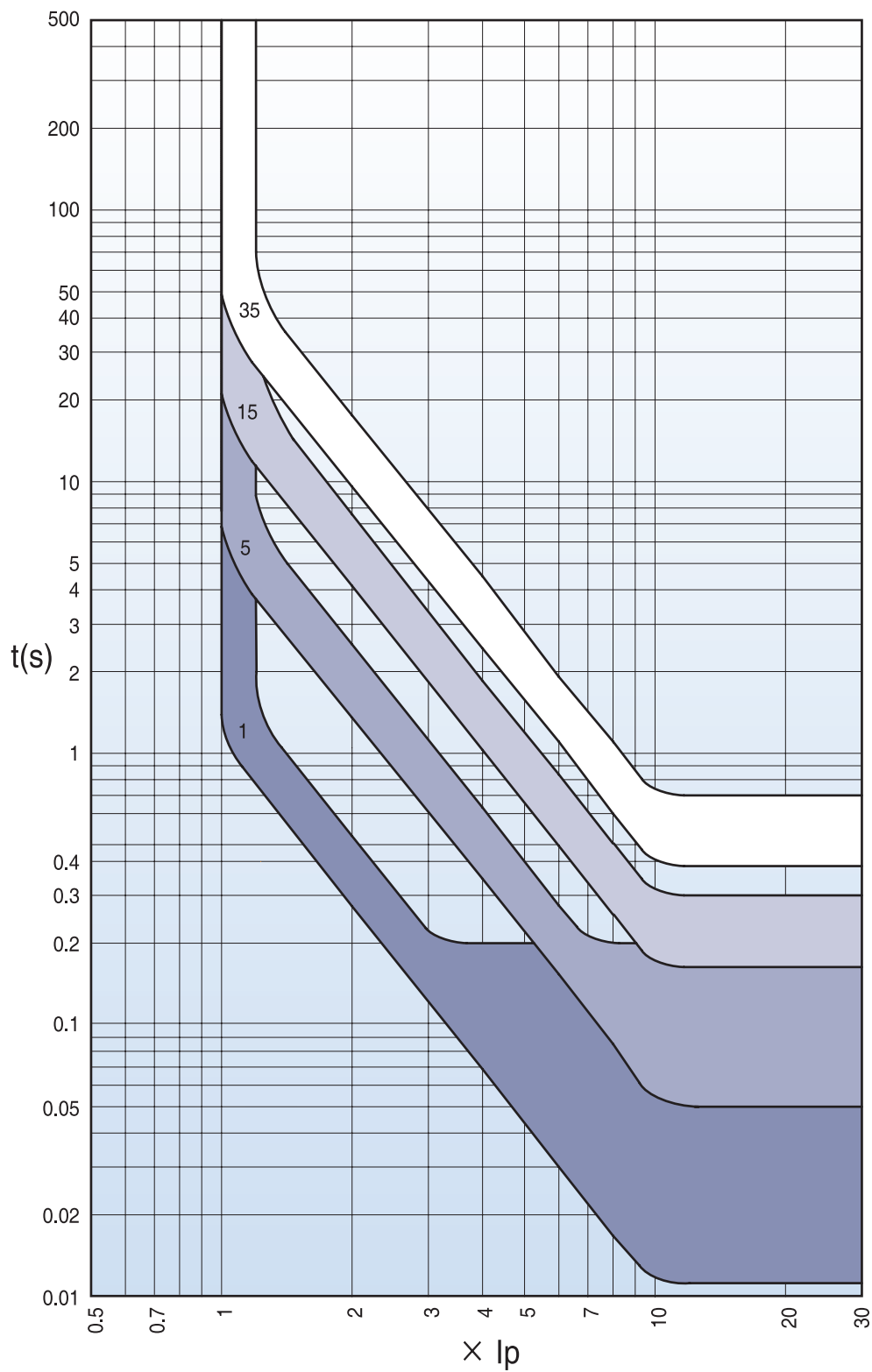
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IDMTL



Characteristics curves

Pre Trip Alarm



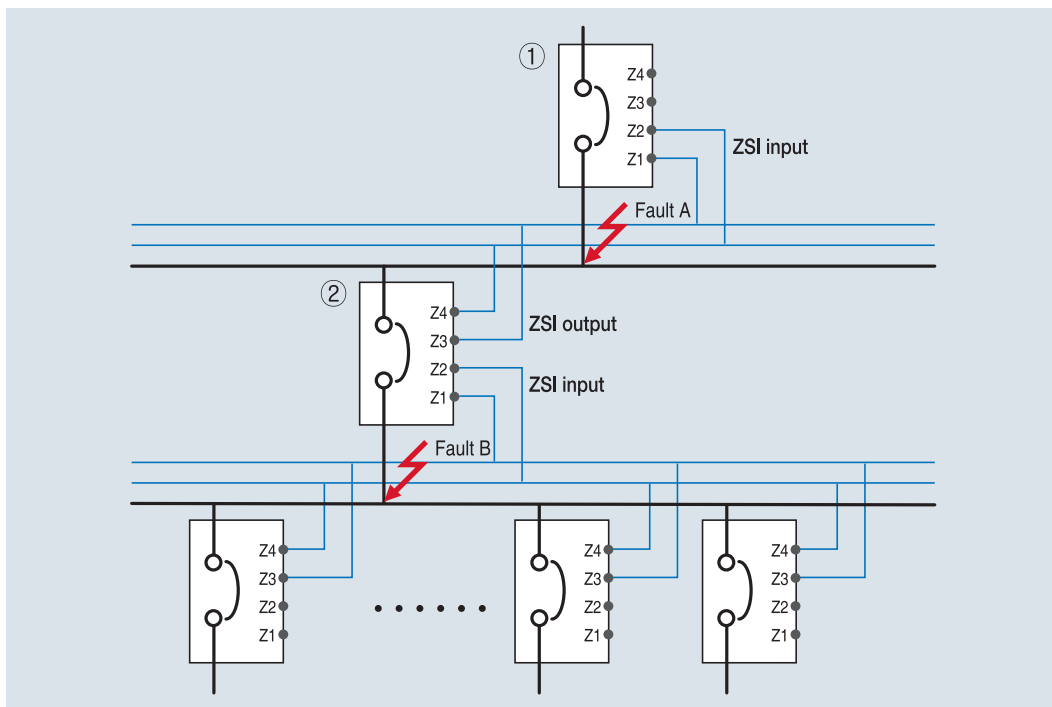
Trip relays

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ZSI - Zone Selective Interlocking (A, P, S type)

Zone-selective interlocking drops the delay time for breakers to eliminate faults. It minimizes the shock that all kinds of electric machineries get under fault conditions.

1. In the case that a short time-delay or a ground fault accident occurs in a ZSI built-in system, the breaker at the accident site sends a ZSI signal to halt the upstream breaker's operation.
2. To prevent a breakdown, the trip relay of the ACB at the accident site activates trip operation with no time delay.
3. The upstream breaker that receives the ZSI signal adheres to a pre-set short time-delay or ground fault time-delay for protective coordination in the system. However, the upstream breaker that does not receive the signal will trip instantaneously.
4. For normal ZSI operation, operation time should be arranged accordingly so that downstream circuit breakers will react before upstream breakers under overcurrent/short time delay/ground fault situations.
5. ZSI connecting line needs to be Max. 3m.



- 1) Occurrence of fault A
 - Only breaker ① performs instantaneous trip operation.
- 2) Occurrence of fault B
 - Breaker ② performs instantaneous trip operation, breaker ① performs trip operation after prearranged delay time
 - But if breaker ② did not break the fault normally, breaker ① performs instantaneous trip operation to protect system.

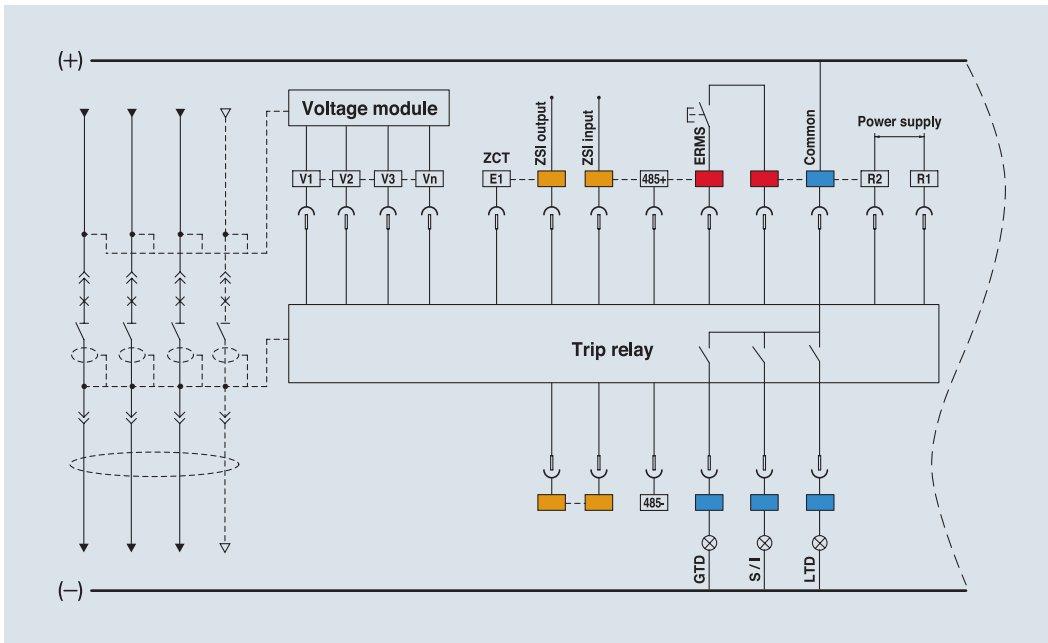
Trip relays

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ERMS and digital I/O (A, P, S type)

ERMS(Energy Reduction Maintenance Setting) is a function to reduce the arc energy to ensure workers' safety. When using the ERMS function, the instantaneous setting value is minimized($2 \cdot I_n$). A, P, and S type trip relays are able to perform the ERMS by digital input and have 3 DO (digital output).

1. To use the ERMS function, short both ends of ERMS terminal
2. Digital input
 - [EM1-EM2] input: ERMS
 - [Z1-Z2] Input: ZSI input
 - [E1-E2] Input: ZCT for earth leakage detection or external CT input
- ※ All DI are dry contact that has 3.3V of recognition voltage. When inputting close by SSR(Solid State Relay) or open-collector, connect collector (Drain) to EM1.
3. Digital output 3a (524, 534, 544-513)
 - Fault output: Long / Short time delay, Instantaneous, Ground fault, UVR, OVR, UFR, OFR, rPower, Vunbal, Iunbal
(Maintains state as Latch form until user pushes reset.)
 - General DO: when setting L / R as remote, it is available to control close/open remotely by using communication.



Trip Relay	Digital Output	Long time	Short time	Instantaneous	Ground	Overload Alarm	OVR	UVR	rPower	Vunbal	Iunbal	OFR	UFR	OPR	Note
P, S type	DO1(524)	●	○	○	○	○	○	○	○	○	○	○	○	○	Programmable
	DO2(534)	○	●	●	○	○	○	○	○	○	○	○	○	○	
	DO3(544)	○	○	○	●	○	○	○	○	○	○	○	○	○	
A type	DO1(524)	●	×	×	×	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Fixed
	DO2(534)	×	●	●	×										
	DO3(544)	×	×	×	●										

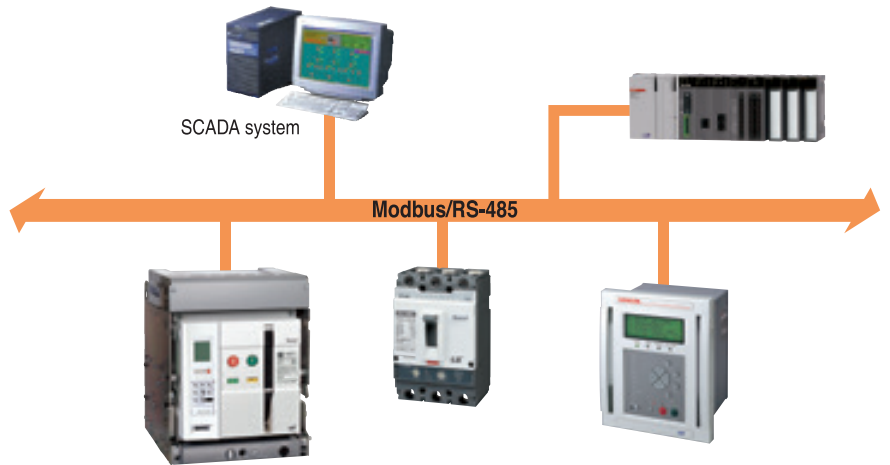
Trip relays

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Communication

Modbus/RS-485

- Operation mode: Differential
- Distance: Max. 1.2km
- Cable :
General RS-485 shielded twist 2-pair cable
- Baud rate :
9600bps, 19200bps, 38400bps
- Transmission method: Half-Duplex
- Termination: 100Ω

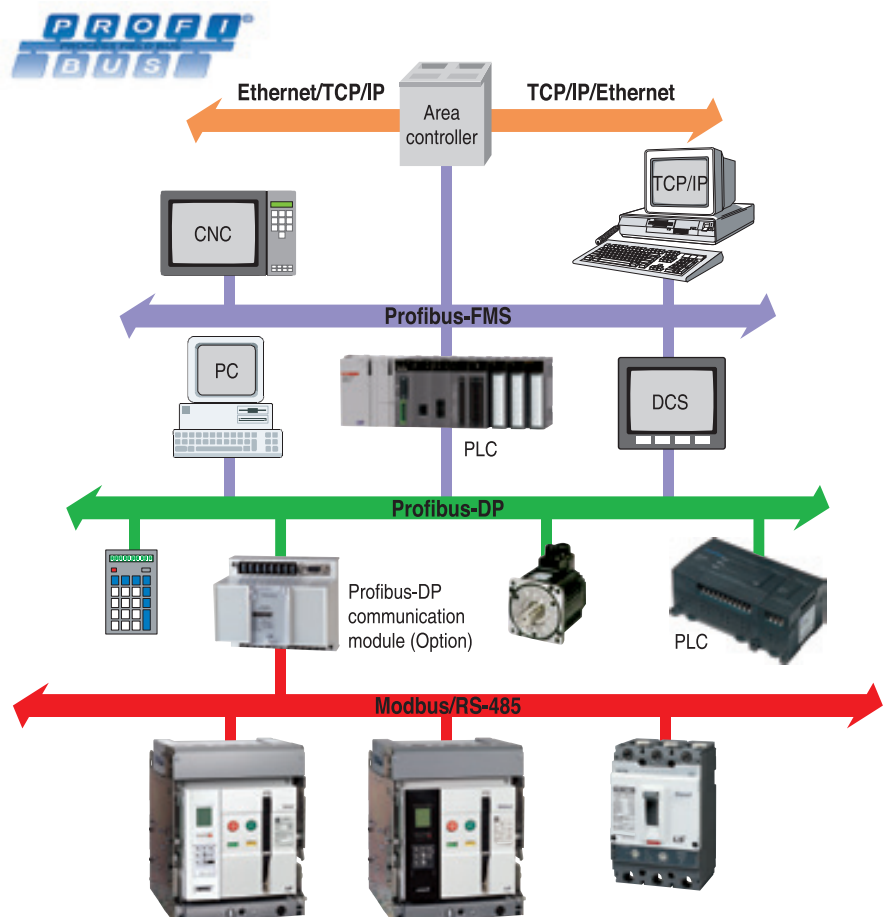


Profibus-DP

- Profibus-DP module is installed separately (Option)
- Operation mode: Differential
- Distance: Max. 1.2km
- Cable :
Profibus-DP shielded twist 2-pair cable
- Baud rate: 9600bps~12Mbps
- Transmission method: Half-Duplex
- Termination resistor: 100Ω
- Standard: EN 50170/DIN 19245



Profibus-DP communication module (Option)



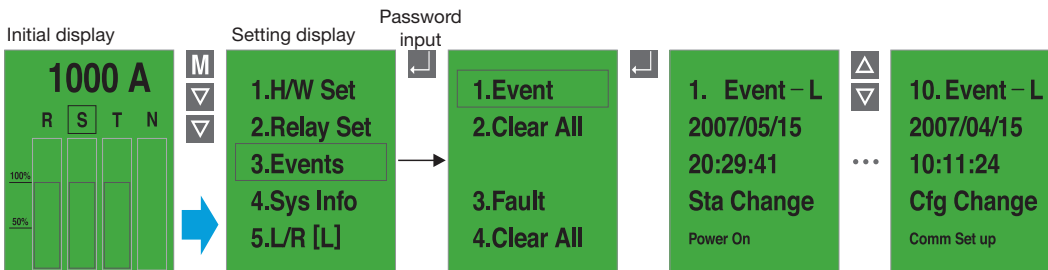
Trip relays

Susol

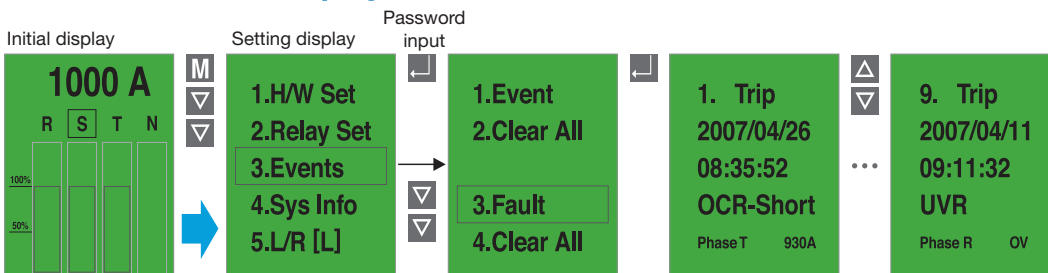
Event & fault recording (P, S type)

When events such as setting change, information change, self-diagnosis error, and status change occur, the P and S types can record up to 256 events in accordance with time(ms). In addition, they can record up to 526 (up to 10 for A type) faults, including information such as fault cause, fault phase, fault value, and so on, in accordance with time(ms).

Event information display



Fault information display



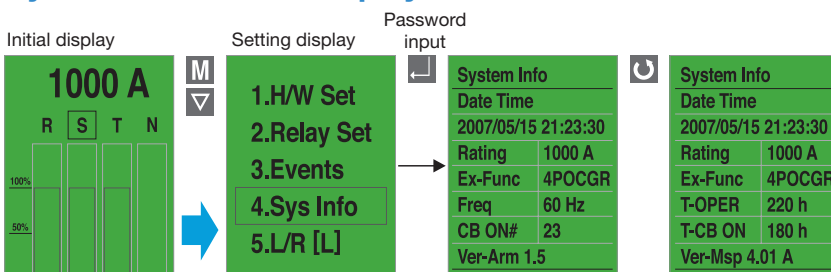
* Fault information is recorded only when there is external control power

System information

P and S type can display the ACB's information as following.

- Present time: year/month/date/hour/minute/ms
- ACB current ratings
- N-phase current ratings: 100%
- Frequency information: 60Hz / 50Hz
- Closing numbers of breaker: CB ON numbers
- Trip relay operating time: OCR ON time
- ON time of breaker: CB ON time
- F/W ver. information

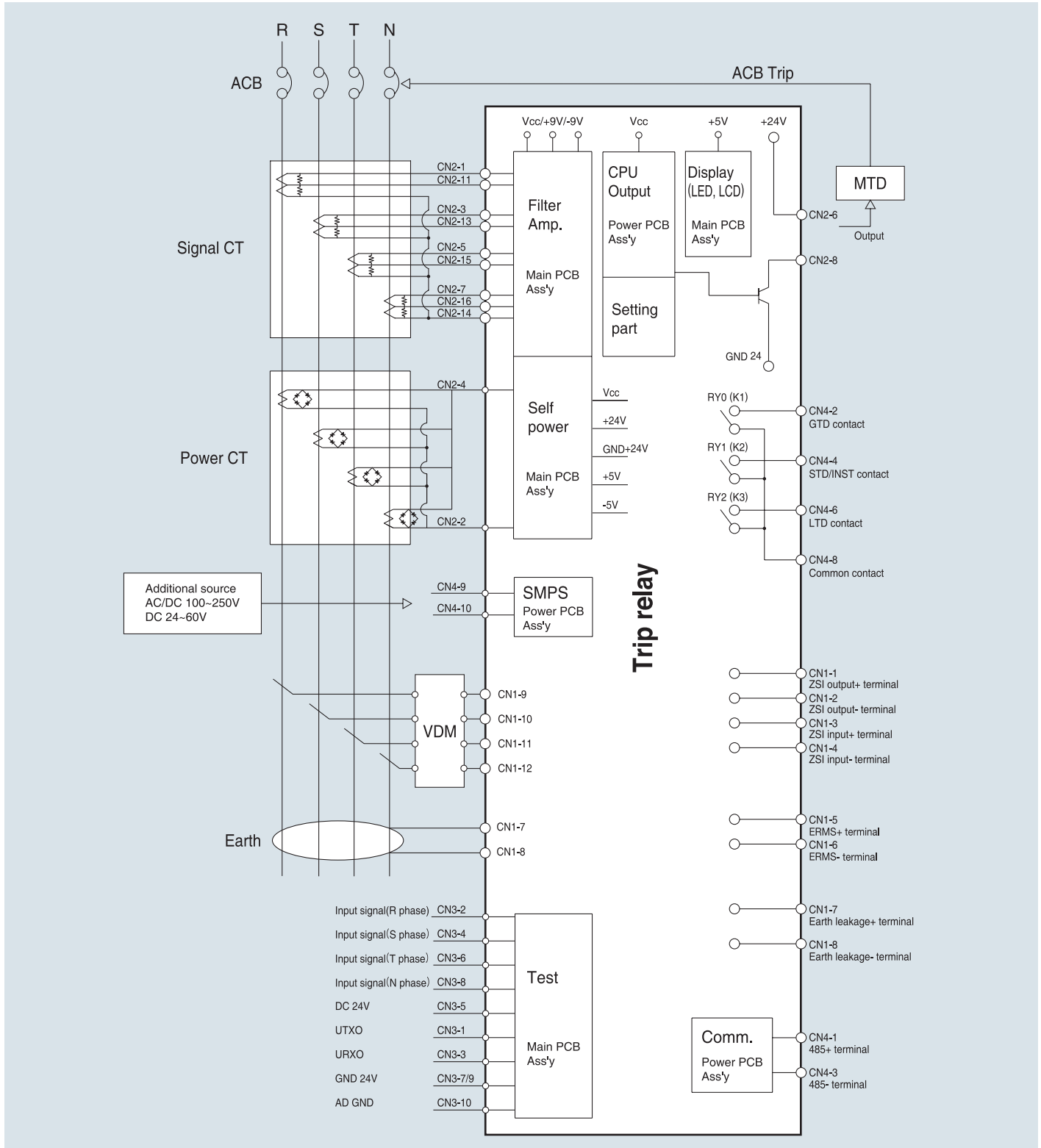
System information display



Trip relays

Susol

System block diagram



Accessories

Susol

Mounting	Accessories		AH		Page
			Standard	Option	
Internal	SHT1	Shunt Coil		○	52
	SHT2	Double Shunt Coil		○	53
	CC	Closing Coil		○	54
	M	Motor		○	55
	CS1	Charge Switch		○	55
	CS2	Charge Switch Communication **		○	55
	UVT	Under Voltage Trip Device		○	56
	AL	Trip Alarm Contact **		○	57
	MRB	Manual Reset Button **		○	57
	RES	Remote Reset Switch		○	58
	RCS	Ready to Close Switch		○	58
	C	Counter	●		65
	AX	Auxiliary Switch		○	59
	TM	Temperature Alarm **		○	74
	External	K1	Key Lock		○
K2		Key Interlock Set		○	60
K3		Double Key Lock		○	61
K5		Profalux Lock (CAMLOCK Type)		○	60
K6		Kirkkey Lock (CAMLOCK Type)		○	60
K7		Kirkkey Lock (CN22 Type)		○	60
B		Lockable ON/OFF Button Cover		○	61
LH		Lifting Hook		○	62
CTD		Condenser Trip Device *		○	62
ATS		Automatic Transfer Switch Controller *		○	63
DC		Dust Cover		○	65
DF		Door Frame		○	68
OT		OCR Tester *		○	64



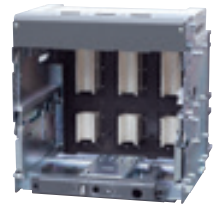
* Non UL Listed.

** Separate purchase unavailable. Each item must be purchased with the main body.

Accessories

Susol

Mounting	Accessories		AH		Page
			Standard	Option	
Trip relay	N	N type		○	26
	A	A type		○	28
	P	P type		○	30
	S	S type		○	32
	VM	Voltage Module		○	36
Cradle	SBC	Shorting "b" Contact *		○	
	MI	Mechanical Interlock **		○	67
	ST	Safety Shutter		○	68
	MIP	Mis-Insertion Prevention Device		○	72
	MOC	Mechanical Operated Cell Switch		○	66
	CEL	Cell Switch		○	69
	DI	Door Interlock		○	67
	BSP	Body Supporter		○	70
	RI	Racking Interlock		○	70
	PL	Lockable Position Lock	●		71
	UDC	UVT Time Delay Controller		○	73
Other	RCO	Remote I/O		○	75
	PC	Profibus-DP comm. module		○	



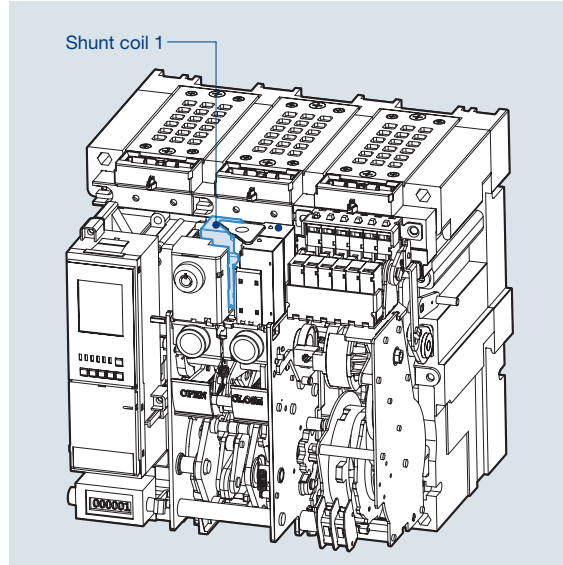
* Non UL Listed.
 ** separate purchase unavailable. Each item must be purchased with the main body.
 *** Voltage module should be purchased with P/S type trip relay.
 **** Available only when the control block is in auto-connection mode.
 ***** Trip unit P type & S type are under development, coming soon.

Accessories

Susol

Shunt Coil [SHT1]

- SHT1 is a control device that remotely trips a circuit breaker when voltage is applied to coil terminals (C1, C2) continuously or instantaneously for a minimum of 200ms.
- When UVT coil is installed, the location of the shunt coil changes.



1. Rated voltage and characteristics of Trip coil

Rated voltage [Vn]		Operating voltage range [V]	Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]		Inrush	Steady-state	
24~30	-	14 ~ 33	200	5	Less than 40ms
48~60	48	28 ~ 66			
100~125	100~125	70 ~ 140			
200~250	200~250	140 ~ 280			
-	380~480 *	266 ~ 528			

Note) Operating voltage range is the min. rated voltage standard for each rated voltage(Vn).

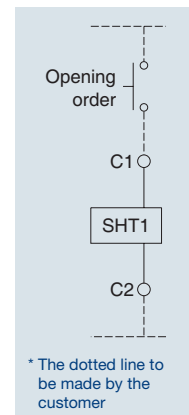
* Non UL Listed.

2. Specification of the wire

- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24~30[V] or DC/AC 48~60[V] of rated voltage.

The maximum wire length

		Rated voltage [Vn]			
		DC 24~30 [V]		DC/AC 48 [V]	
Wire type		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	95.7m	61m	457.8m	287.7m
	85%	62.5m	38.4m	291.7m	183.2m



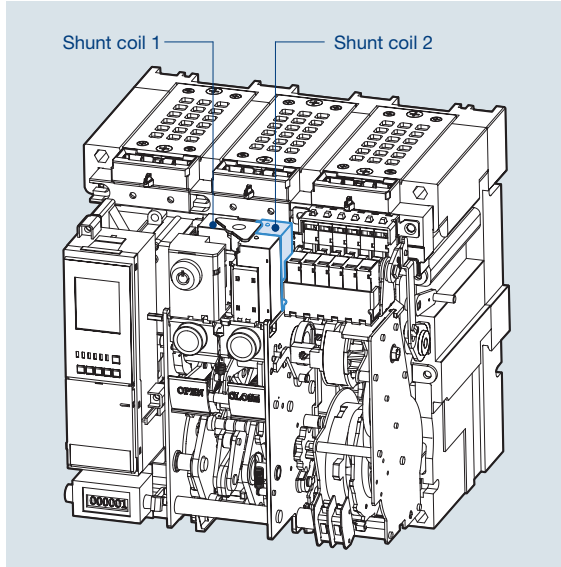
Wiring Diagram

Accessories

Susol

Double Shunt Coil [SHT2]

- SHT2 is a control device that remotely trips a circuit breaker when SHT1 does not operate normally, allowing the circuit breaker to still be tripped safely.
- Shunt coil 1: Install it at existing location.
- Shunt coil 2: Install it on the right side of the Shunt coil 1
- UVT coil is unavailable when installing Double Shunt Coil.



1. Rated voltage and characteristics of Trip coil

Rated voltage [Vn]		Operating voltage range [V]	Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]		Inrush	Steady-state	
24~30	-	14 ~ 33	200	5	Less than 40ms
48~60	48	28 ~ 66			
100~125	100~125	70 ~ 140			
200~250	200~250	140 ~ 280			
-	380~480 *	266 ~ 528			

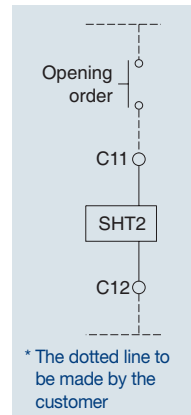
Note) Operating voltage range is the min. rated voltage standard for each rated voltage(Vn).
* Non UL Listed.

2. Specification of the wire

- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24~30[V] or DC/AC 48~60[V] of rated voltage.

The maximum wire length

		Rated voltage [Vn]			
		DC 24~30 [V]		DC/AC 48 [V]	
Wire type		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	95.7m	61m	457.8m	287.7m
	85%	62.5m	38.4m	291.7m	183.2m



* The dotted line to be made by the customer

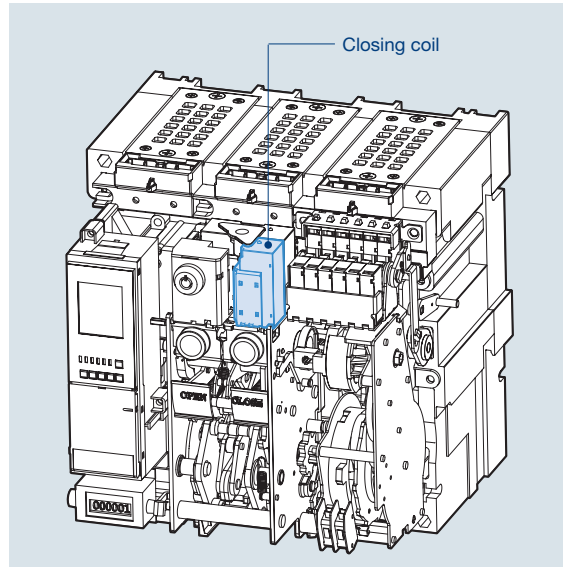
Wiring Diagram

Accessories

Susol

Closing Coil [CC]

- It is a control device that remotely trips a circuit breaker when voltage is applied to coil terminals (A1, A2) continuously or instantaneously for a minimum of 200ms.



1. Rated voltage and characteristics of Closing coil

Rated voltage [Vn]		Operating voltage range [V]	Power consumption (VA or W)		Close time [ms]
DC [V]	AC [V]		Inrush	Steady-state	
24~30	-	14 ~ 33	200	5	Less than 80ms **
48~60	48	28 ~ 66			
100~125	100~125	70 ~ 140			
200~250	200~250	140 ~ 280			
-	380~480 *	266 ~ 528			

Note) Operating voltage range is the min. rated standard for each rated voltage (Vh).

* Non UL Listed.

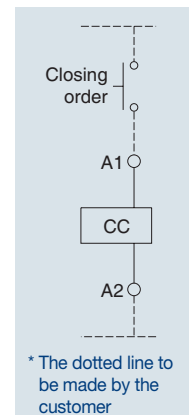
** Close time of G frame (3200~5000A) is less than 95ms.

2. Specification of the wire

- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24~30[V] or DC/AC 48~60[V] of rated voltage.

The maximum wire length

		Rated voltage [Vn]			
		DC 24~30 [V]		DC/AC 48 [V]	
Wire type		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	95.7m	61m	457.8m	287.7m
	85%	62.5m	38.4m	291.7m	183.2m



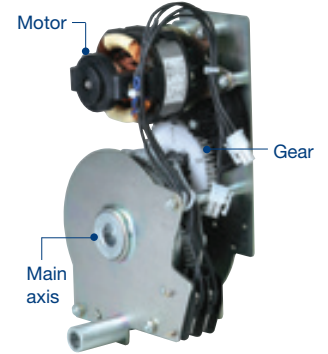
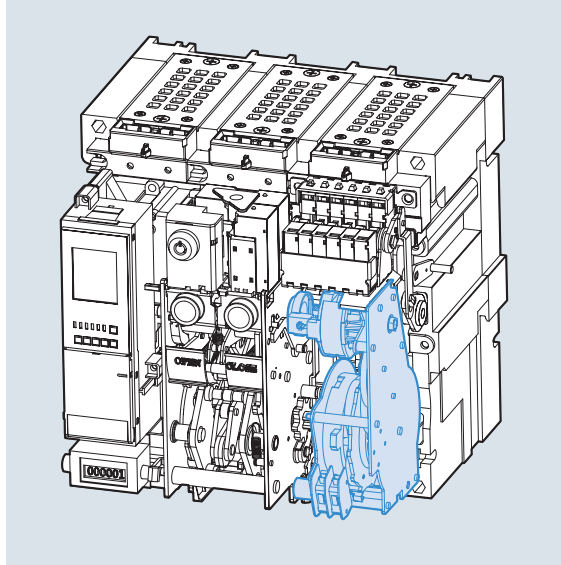
Wiring Diagram

Accessories

Susol

Motor [M]

- Charges the closing spring of a circuit breaker using an external power source. Without an external power source, the closing spring should be charged manually.
- Operating voltage range 85%~110%Vn



Input voltage(V)	DC 24~30V	AC/DC 48~60V	AC/DC 100~130V	AC/DC 200~250V	AC 380V *	AC 440~480V *
Load current(max.)	5A	3A	1A	0.5A	0.3A	0.3A
Starting current(Max.)	5 times of load current					
Load rpm(Motor)	15000 ~ 19000 rpm					
Charge time	Less than 5sec.					
Dielectric strength	2kV/min					
Using temperature range	-20°~ 60°					
Using humidity range	Max. RH 80% (No dew condensation)					
Endurance	15,000 cycle (Load connection, 2 times/min)					
Charge switch	10A at 250VAC					

* Non UL Listed.

Charge Switch [CS1]

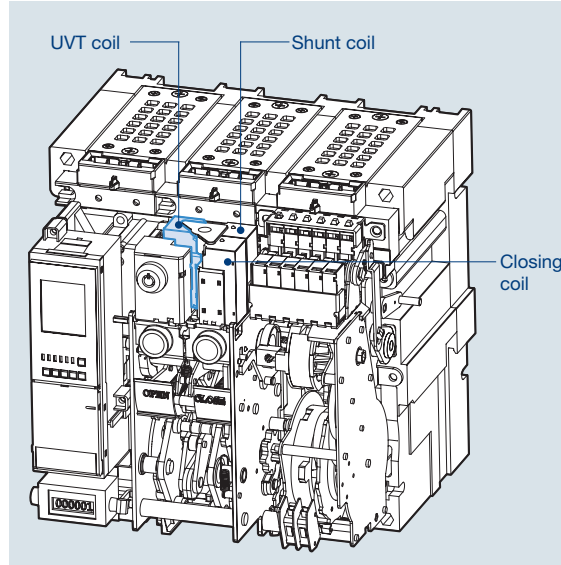
Charge Switch Communication [CS2]

- Built-in contact that sends a signal to an external device when motor charging is complete. (2a)
- Has a “1a” contact for communication and another “1a” contact for complete charging.
- When using an extra communication module (Remote I/O), the state of contacts can be displayed through the network.

Classification	Standard		Remark
Contactor Capacity	250/125 Vac	10 A	
	250 Vdc	0.3 A	
	125 Vdc	0.6 A	
	48 Vdc	3 A	
	24 Vdc	5 A	

Under Voltage Trip device [UVT]

- If the voltage of the main or the control power is under voltage, the UVT installed inside of the breaker breaks the circuit automatically. UVT time-delay controller (UDC) should be connected in order to present the time-delay function because UVT operates instantaneously.
- The closing of a circuit breaker is mechanically and electrically impossible if control power is not supplied to UVT. To close the circuit breaker, 65~85% of rated voltage should be applied to both terminals of UVT coil (D1, D2).
- When using UVT coil, the double trip coil can not be used, and the location of trip coil is changed.



1. Rated voltage and characteristics of UVT coil

Rated voltage [Vn]		Operating voltage range [V]		Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]	Pick up	Drop out	Inrush	Steady-state	
24~30	-	0.65~0.85 Vn	0.3~0.6 Vn	200	5	Less than 50ms
48~60	48					
100~130	100~130					
200~250	200~250					
-	380~480					

Note) Operating voltage range is the min. rated standard for each rated voltage (Vh).

2. Specification of the wire

- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24~30[V] or DC/AC 48~60[V] of rated voltage.

The maximum wire length

		Rated voltage [Vn]			
		DC 24~30 [V]		DC/AC 48 [V]	
Wire type		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	48.5m	30.5m	233.2m	143.9m
	85%	13.4m	8.8m	62.5m	39.3m

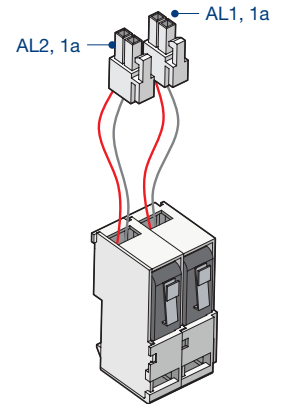
Note) In case of using UVT coil, the location of Shunt coil is changed.

Accessories

Susol

Trip Alarm Contact [AL]

- When a circuit breaker is tripped by OCR (Over Current Relay), which operates against the fault current, Trip Alarm switch sends a signal to an external device that the circuit breaker has tripped. (Installed inside circuit breaker)
- When a circuit breaker is tripped by fault current, a mechanical trip indicator (MRB, Manual Reset Button) pops out from the front cover and closes the alarm switch (AL) which then sends a signal to an external device that the breaker has been tripped by fault current.
- MRB and AL will be triggered only when the breaker is tripped by OCR; they will not be triggered by the OFF operation of the trip coil or by the Off button. of trip coil.
- To re-close a circuit breaker after a trip, press MRB to reset it for closing.
- 2pcs of electrical trip switch (AL1, AL2, 1a) are provided (Option)
- Trip alarm contact and MRB(Manual reset bottom) need to be purchased together.

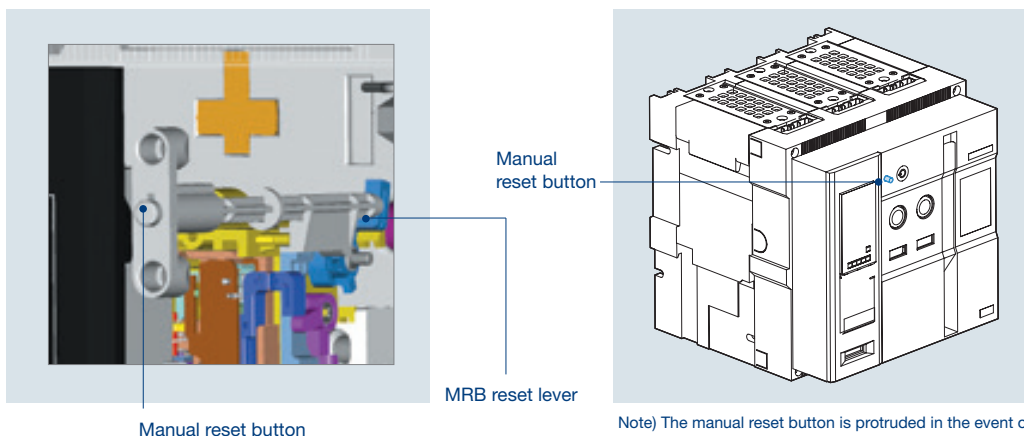


1. Electrical characteristics of trip alarm contact

Classification	Standard		Remark
Contactor Capacity	250/125 Vac	10 A	
	250 Vdc	0.3 A	
	125 Vdc	0.6 A	
	48 Vdc	3 A	
	24 Vdc	5 A	

Manual Reset Button [MRB]

- Function that manually resets a circuit breaker when it is tripped by OCR.
- When a circuit breaker is tripped by fault current, a mechanical trip indicator (MRB, Manual Reset Button) pops out from the front cover and closes the alarm switch (AL) which then sends a signal to an external device that the breaker has been tripped by fault current.
- MRB will only be triggered when the circuit breaker is tripped by OCR but not by OFF operation of circuit breaker. To re-close a circuit breaker after a trip, press MRB to reset it for closing.



Accessories

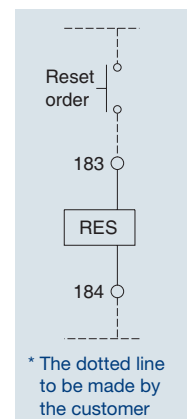
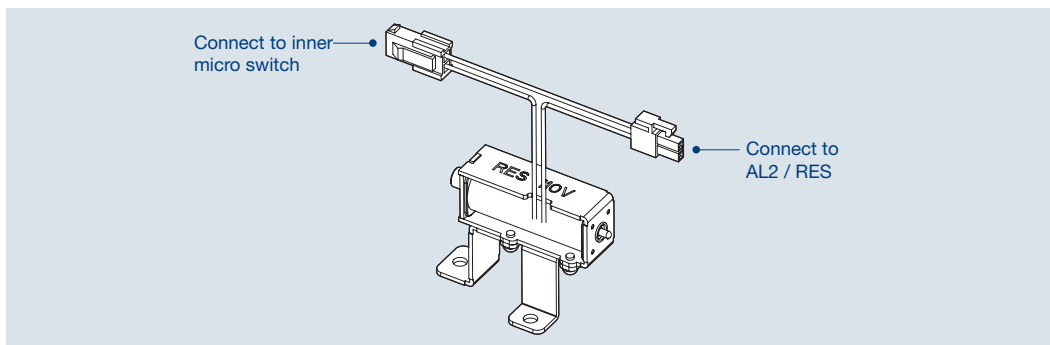
Susol

Remote Reset Switch [RES]

- Following tripping, this function resets the "fault trip" alarm contacts(AL) and the mechanical indicator(MRB) and enables circuit breaker closing.
Push button switch : AC 125V 10A, AC 250V 6A, DC 110V 2.2A, DC 220V 1.1A Resistive load
- In case of auto reset type circuit breaker:
Following tripping, a reset of Manual Reset Button(MRB) or Remote Reset Switch(RES) is no longer required to enable circuit breaker closing.
The mechanical indicator(MRB) and electrical indicator(AL) remain in fault position until the reset button is pressed.
- AL2 and RES are alternative.

1. Rated voltage and rated current of RES

Rated voltage	Operating current(Max.)		Operating time	Wire spec.
	AC	DC		
AC/DC 100~130V	AC	6A	Less 40ms	#14 AWG (2.08 mm ²)
	DC	5A		
AC/DC 200~250V	AC	3A		#16 AWG (1.31 mm ²)
	DC	2.5A		

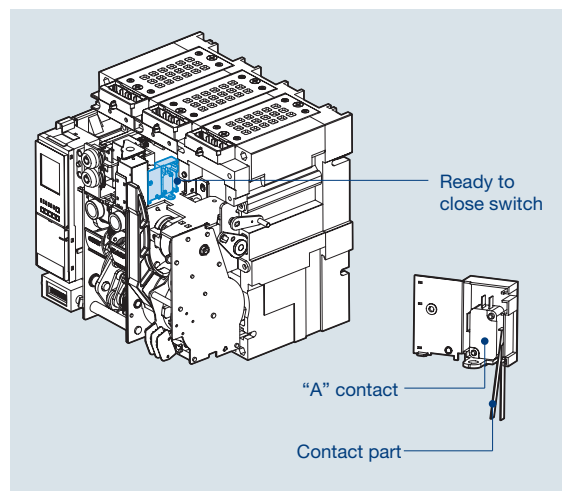


Wiring Diagram

Ready to Close Switch [RCS]

- Interlocks with mechanism of the circuit breaker.
- Indicates if the circuit breaker is ready for closing operation.
- When mechanism is in OFF position or in Charge, contact is output with "ON" and it indicates that mechanism can be closed.

Classification	Standard	Remark
Contactor Capacity	250/125 Vac	10 A
	250 Vdc	0.3 A
	125 Vdc	0.6 A
	48 Vdc	3 A
	24 Vdc	5 A



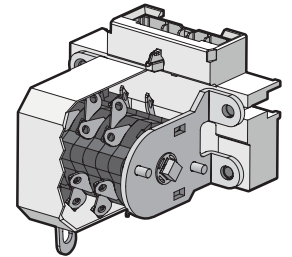
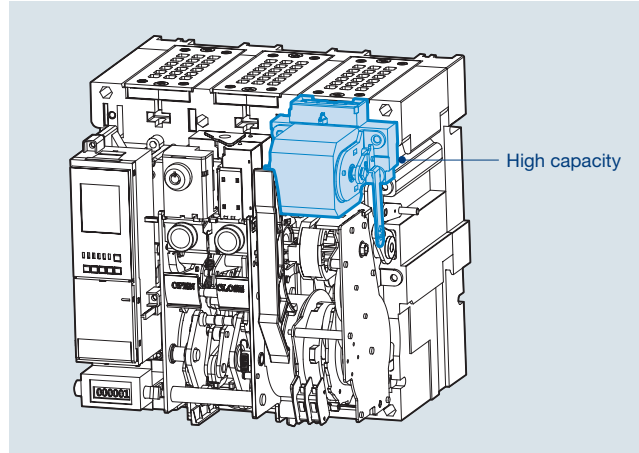
Accessories

Susol

Auxiliary switch [AX]

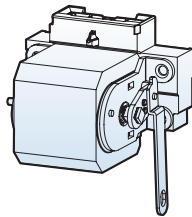
- Contact used to remotely monitor ON/OFF position of the ACB.

AUX. contact & charging types	
HX	High capacity OFF charge 5a5b
HC	High capacity ON charge 5a5b
GX	High capacity OFF charge 3a3b
GC	High capacity ON charge 3a3b
JC	High capacity ON charge 6a6b



Standard classification

High capacity	
2000, 5000AF	4000, 6300AF



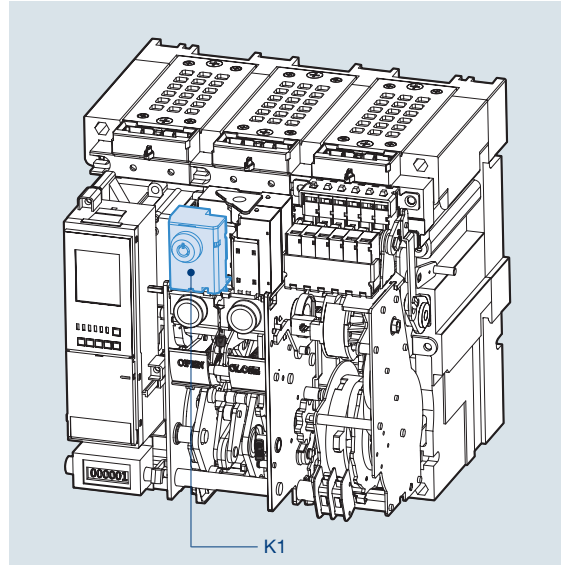
Classification		Resistive load	Inductive load	Remark	
Minimum current		DC5V, 1mA			
Contactor Capacity	AC	460V	5A	2.5A	
		250V	10A	10A	
		125V	10A	10A	
	DC	250V	3A	1.5A	
		125V	10A	6A	
		30V	10A	10A	
No. of Contact that can be used	GX	3a3b		Standard charging type	
	HX	5a5b			
	GC	3a3b			
	HC	5a5b		Rapid auto-reclosing charging type	
	JC	6a6b			

Accessories

Susol

Key Lock

- Device that prevents unauthorized users from operating the circuit breaker when two or more circuit breakers are in use at the same time.
- K1, K5, K6, K7 : Preventing mechanical closing
- K5 : PROFALUX LOCK (CAMLOCK type)
- K6 : KIRKKEY LOCK (CAMLOCK type)
- K7 : KIRKKEY LOCK (CN22 type)



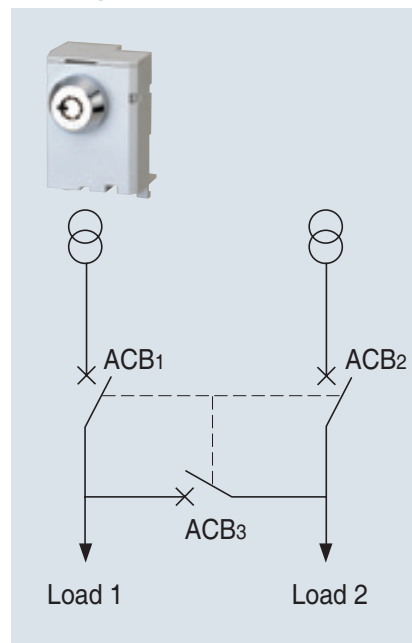
Key Interlock Set [K2]

- 3 circuit breakers can be arranged for continuous power supply to the load side and interlocked mutually by using key locks embedded in each circuit breaker.

ACB-1	ACB-2	ACB-3	Status	
			LOAD1	LOAD2
●	●	●	OFF	OFF
●	○	○	ON	ON
○	●	○	ON	ON
○	○	●	ON	ON
●	●	○	OFF	OFF
●	○	●	OFF	ON
○	●	●	ON	OFF

○: Release ●: Lock

Wiring

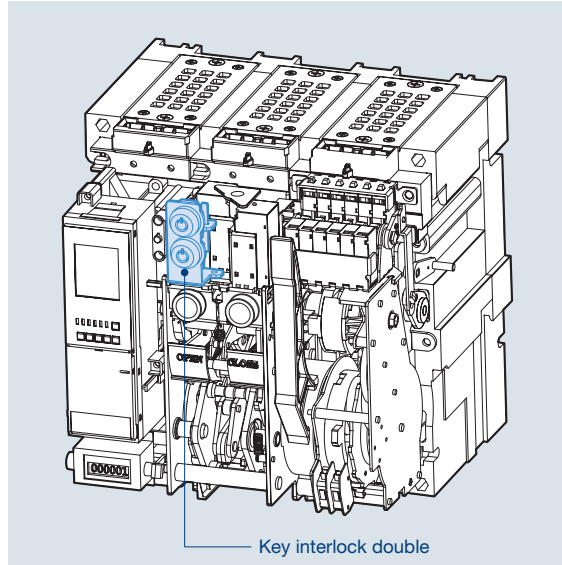


Accessories

Susol

Double Key Lock [K3]

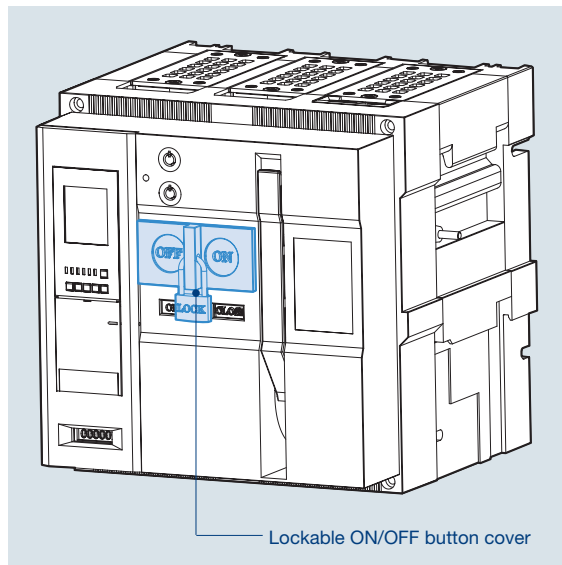
- When only two keys are released at the same time, circuit breakers operate. Handling method is same as K1.



Lockable ON/OFF Button Cover [B]

- Prevents mishandling of or accidents with the ACB's manual closing/trip buttons.
- It is not possible to handle ON/OFF operation under the "Button lock" status.

Note) Padlocks(Ø5 ~ Ø6) are not supplied.

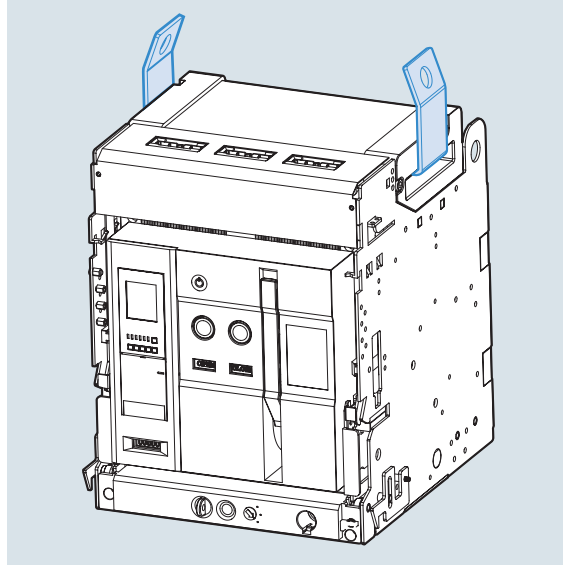


Accessories

Susol

Lifting Hook [LH]

- Device that makes an ACB easy to shift.
- Please hang it to both handles of the arc cover.



Condenser Trip Device [CTD]

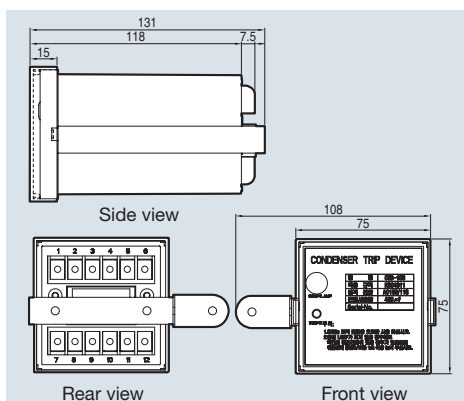
- Allows for a circuit breaker to trip during a certain amount of time (see chart) when the breaker loses control power supply.
- Used in combination with the Trip Coil (Shunt coil, SHT)
- In instances without DC power, it can be used as a rectifier that supplies DC power to a circuit breaker by rectifying AC power.

Ratings

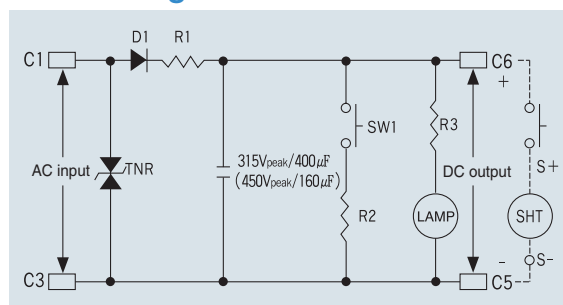
Ratings	Specification	
Model	CTD-100	CTD-200
Rated input voltage (V)	AC 100/110	AC 200/220
Frequency (Hz)	50/60	50/60
Rated charge voltage (V)	140/155	280/310
Charging time	Within 5S	Within 5S
Trip-able time	Max. 3 min.	Max. 2 min.
Range of Input voltage (%)	85~110	85~111
Condenser capacity	400 μ F	160 μ F



External dimension



Circuit diagram



* Non UL Listed.

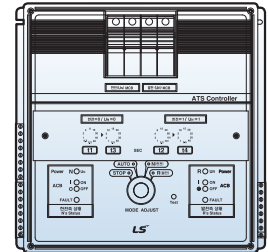
Accessories

Susol

Automatic Transfer Switch Controller [ATS]

Ratings

Model type	ATSC-110	ATSC-220
Rated voltage	AC 110V	AC 220V
Voltage range	AC 93.5(±5%) ~126.5V(±5%)	AC 187(±5%) ~ 253V(±5%)
Frequency	50Hz/60Hz	
Power consumption (apparent power)	15.4W	
4-location switch (stop, N, R, Auto)	■	■
Time setting (t1~t4)	■	■
Fault function (OCR/Circuit breaker trouble)	■	■
Output contact (Auto, Load burden)	■	■



- t1: The delayed time from when UN (power supply of electric company) is tripped to when generator start-up signal contact is closed. (t1: 0.2, 0.5, 1, 2, 4, 8, 15, 30, 40, 50secs)
- t2: The delayed time from when UN is closed to when ACB₂ is tripped. (t2: 0.2, 1, 2, 4, 8, 15, 30, 60, 120, 240secs)
- t3: The delayed time from when ACB₁ is tripped to when ACB₂ is closed. (t3: 0.5, 1, 2, 5, 10, 15, 20, 25, 30, 40secs)
- t4: The delayed time from when ACB₂ is tripped to when ACB₁ is closed. (t4: 0.5, 1, 2, 5, 10, 15, 20, 25, 30, 40secs)
- Stop-mode: This mode is for compulsory trip of ACB₁(electric power company) or ACB₂ (power station) when UN (power supply of electric power company) or UR (power supply of power station) is available
*UN or UR should be kept in ON position
- N-mode: This mode is for compulsory closing of ACB₁ when UN is available.
* ON or OFF position of UR is irrelevant. If converting to N-mode while UR is in use, generator start-up signal contact will be opened.
- R-mode: This mode is for compulsory closing of ACB₂ during the use of UR regardless of if UN is available or not.
- Auto-mode: This mode is for transferring a circuit breaker automatically to available power supply of UN or UR. In short, it trips the circuit breaker when power supply is not available and it close the circuit breaker when power supply is available.

* Non UL Listed.

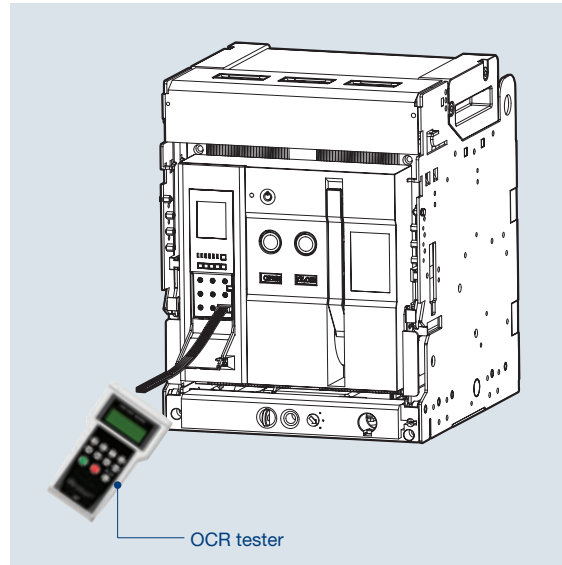
Accessories

Susol

OCR Tester [OT]

• It is a device which can test for the operation of Trip Relay under no power condition.

1. Maximum 17 times the rated current can be inputted.
2. It is possible to enter the current value and phase on each of R/S/T/N
3. Frequency is adjustable.
4. It is able to test for long time delay/short time delay/instantaneous/ground fault.



Configuration



R S T N	R, S, T, N phase signal input
⤴ ⤵	Increase/Decrease signal input
ENT. ESC	Signal setting/Delete
START STOP	Waveform generation/Stop
50Hz 60Hz Hz	Select frequency

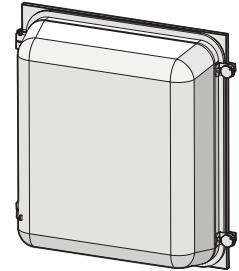
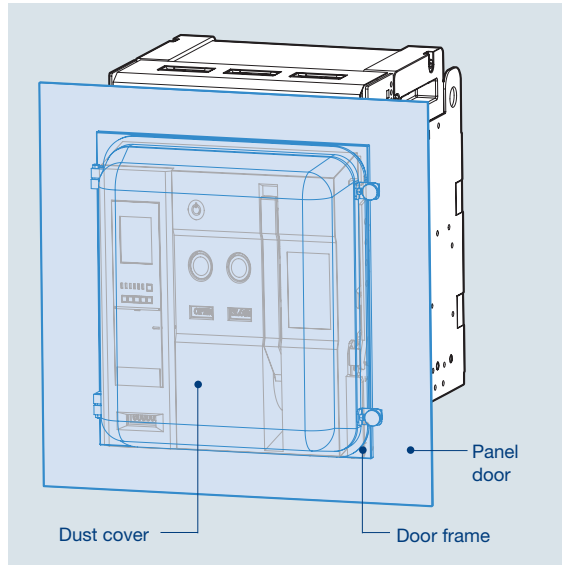
* Non UL Listed.

Accessories

Susol

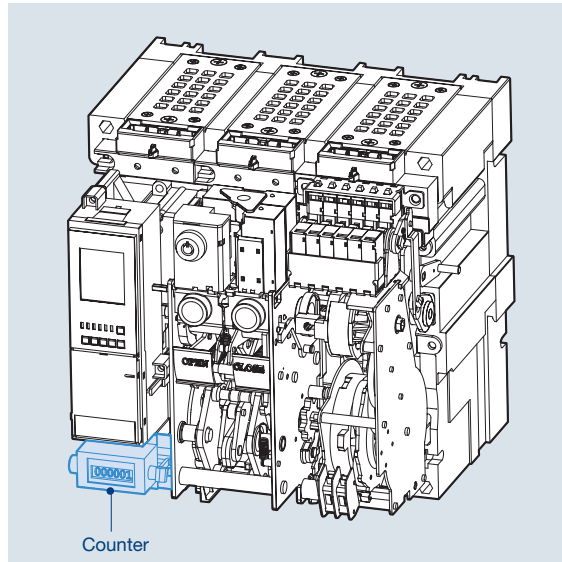
Dust Cover [DC]

- Attach it to the door frame.
- Improves the seal and protects the product from dust and moisture that may interfere with the regular operation of the circuit breaker (IP5X).
- Transparent to allow the front of the ACB to be visible. Cover can be opened/closed until ACB is drawn out past TEST position.

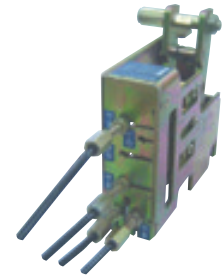
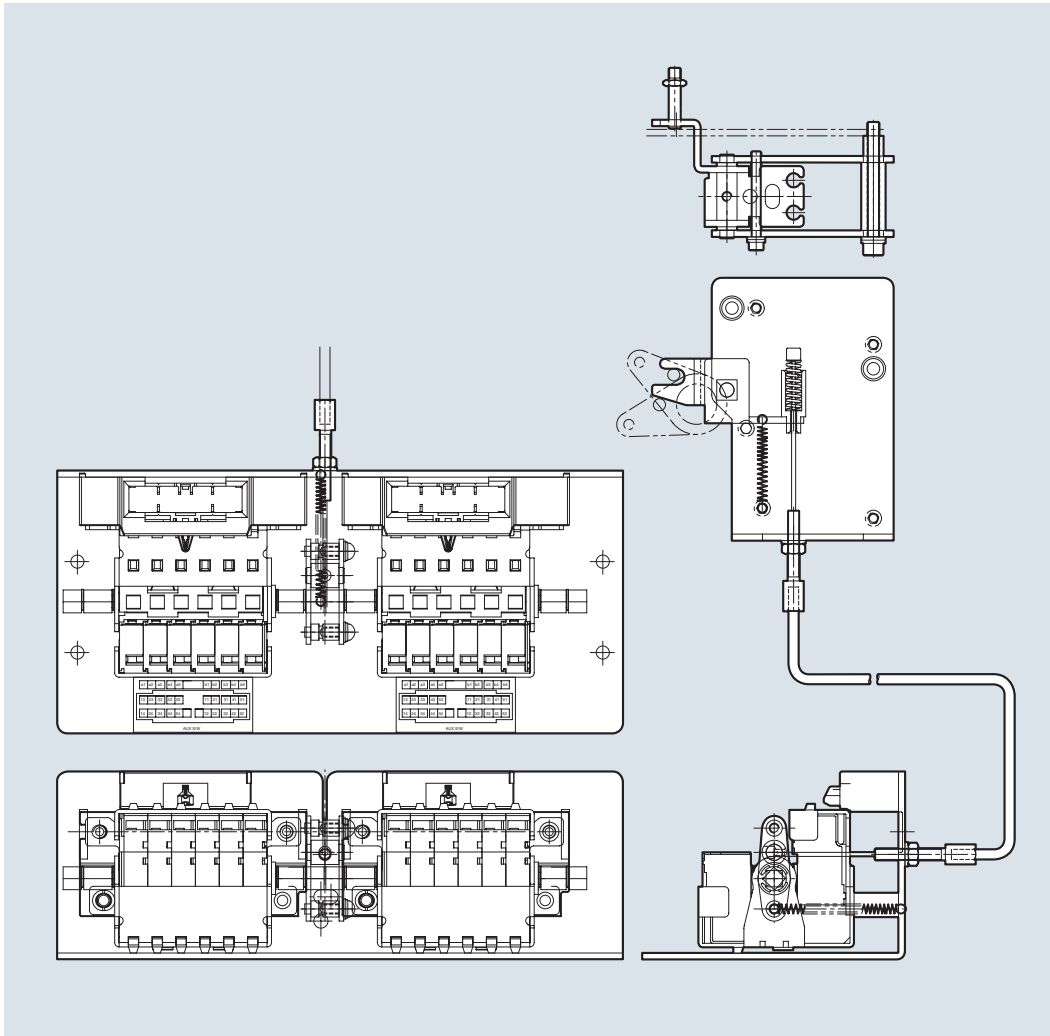


Counter [C]

- It displays the total number of ON/OFF operation of ACB.



Mechanical Operated Cell Switch [MOC]

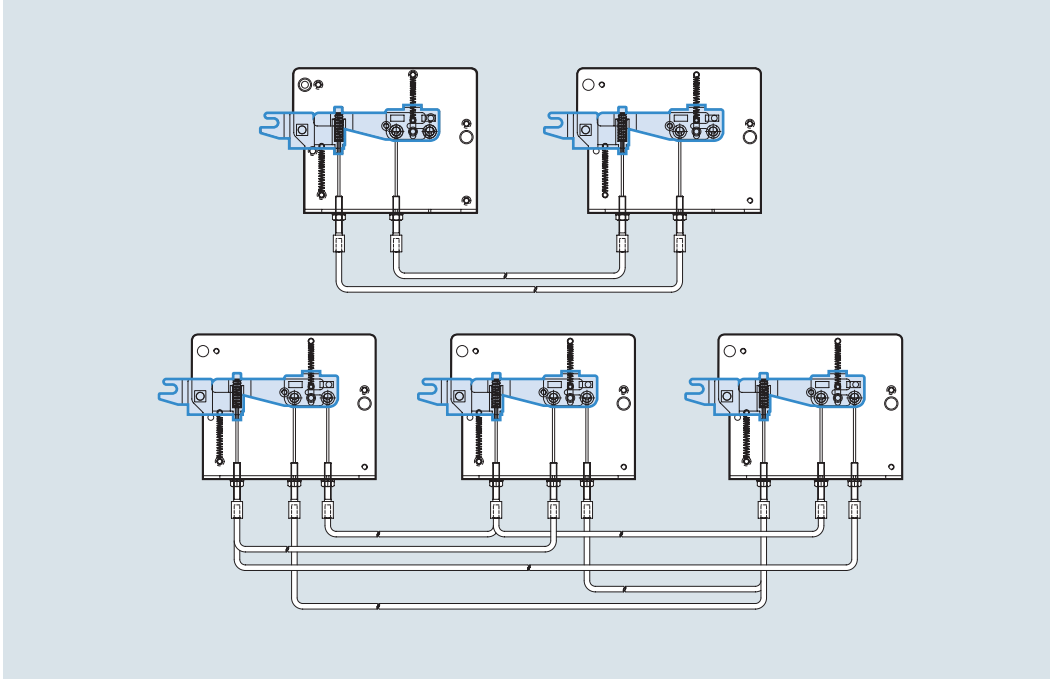


- The contact (10a10b) which displays the ON/OFF condition of ACB.
Mechanically operates only when the breaker is in "CONNECTED" position.
A standard type and a high capacity type are available.
- The contact capacity is as same as the ratings of aux. contacts.
- When MOC link is installed on cradle, MOC can be equipped inside the panel.

Accessories

Susol

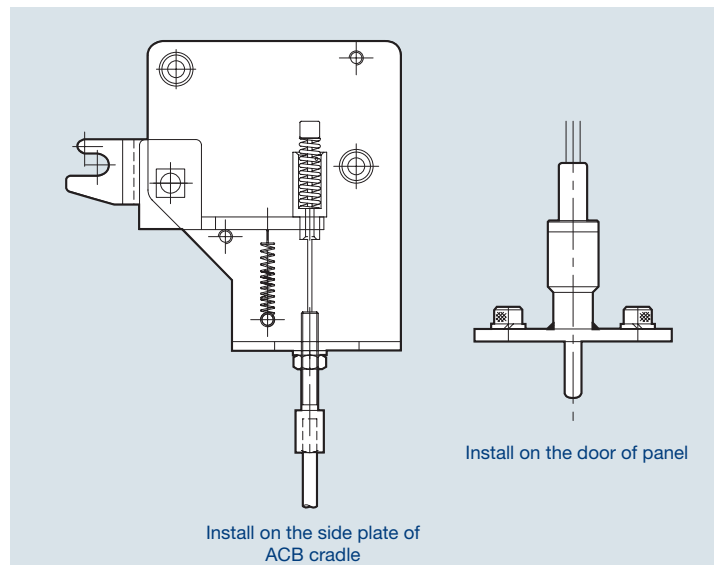
Mechanical Interlock [MI]



- Mechanically interlocks closing and trip between two or three breakers. so as to prevent unintended operation at the same time.
- Wire type interlock can be applied to up to 3 breakers

Door Interlock [DI]

- Safety device that prevents the panel door from being opened when the circuit breaker is in the “ON” position.




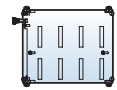

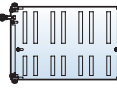
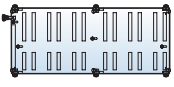
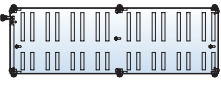
Accessories

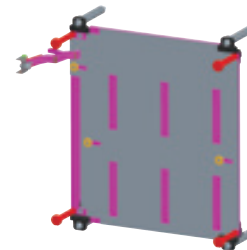
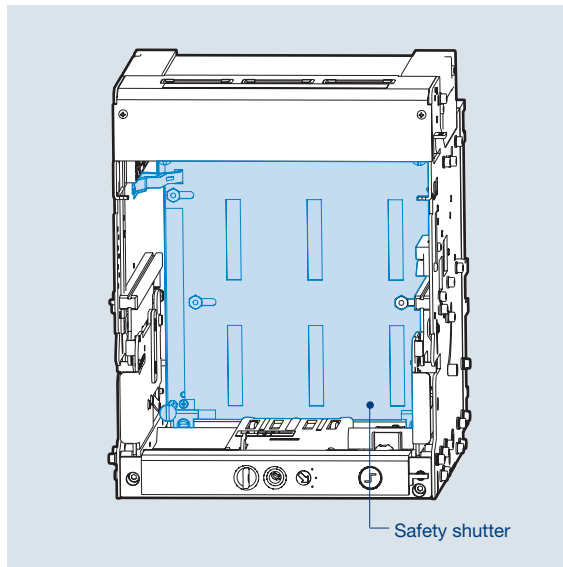
Susol

Safety Shutter [ST]

- Automatic safety device that protects the connectors of the main circuit by cutting off dangerous contact from outside while the breaker is drawn out. When the ACB is drawn in, the shutter is automatically opened.
- There are 3 types of Safety Shutter and they are divided as shown in the figure below.

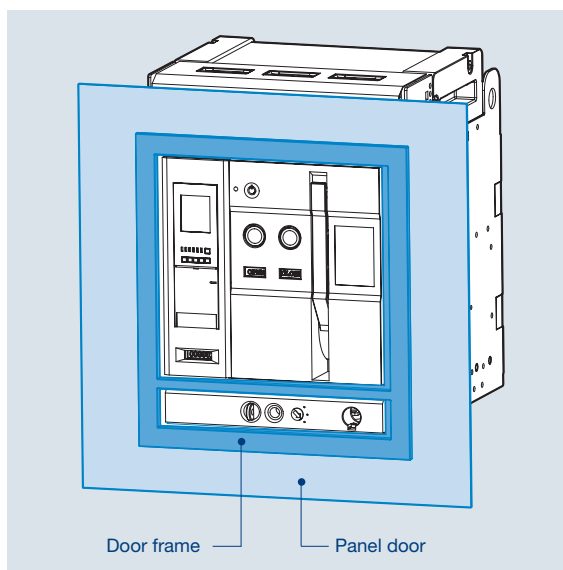
The types of safety shutter plate

1600AF, 3P	1600AF, 4P
	
3200AF, 3P	3200AF, 4P
	
6000AF, 3P	6000AF, 4P
	



Door Frame [DF]

- When structuring the embedded type of ACB panel, it protects the protrude front of ACB and the cutting side of panel door by attaching it to the panel door.



Fixed type



Draw-out type

Accessories

Susol

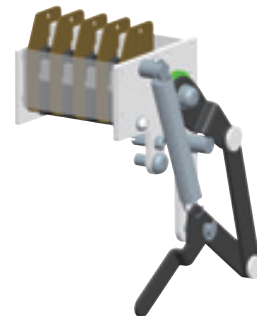
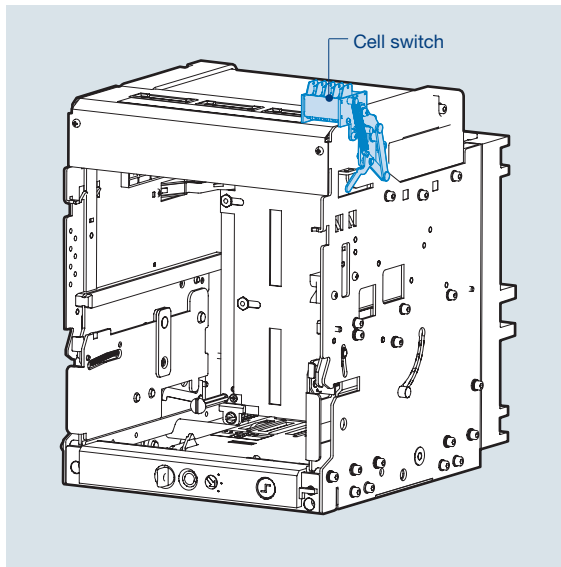
Cell Switch [CEL]

- Contact that indicates the present position of ACB.(CONNECTED, TEST, DISCONNECTED)

<Contact configuration>

4C: 1Disconnected +1Test +2Connected

※ Contact configuration can be changeable if necessary.



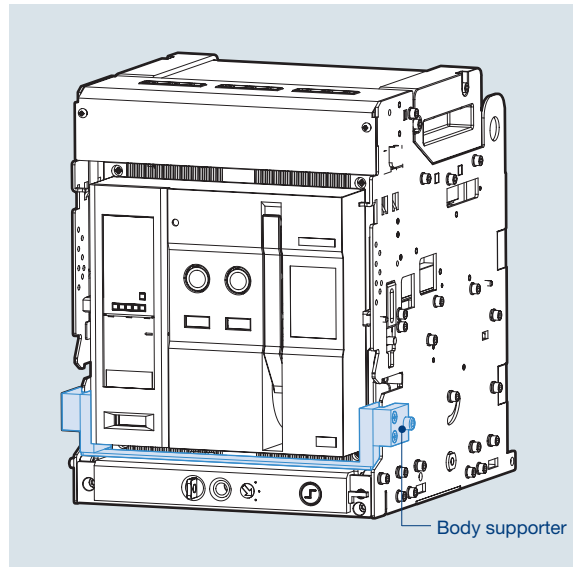
ACB position		DISCONNECTED		CONNECTED
Draw-in and draw-out position		DISCONNECTED	TEST	CONNECTED
Contact operation	CL-C (Connected)	OFF	OFF	ON
	CL-T (Test)	OFF	ON	OFF
	CL-D (Disconnected)	ON	OFF	OFF
Classification		Standard		
Contact capacity	250/125 Vac			10 A
	250 Vdc			0.3 A
	125 Vdc			0.6 A
	48 Vdc			3 A
	24 Vdc			5 A
Contact number		4C		

Accessories

Susol

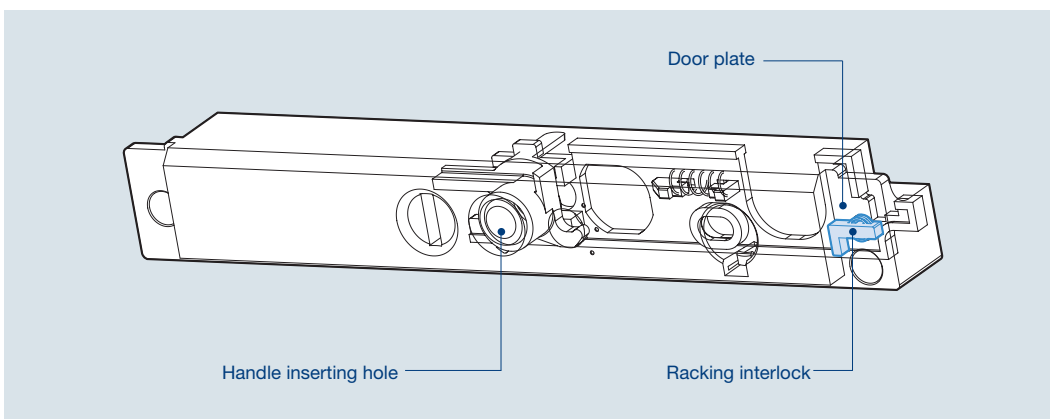
Body Supporter [BSP]

- Interlocks the main body of the circuit breaker and the cradle mechanically to fix the former in connected position. Therefore, all draw-in/out are not available.



* Non UL Listed.

Racking Interlock [RI]

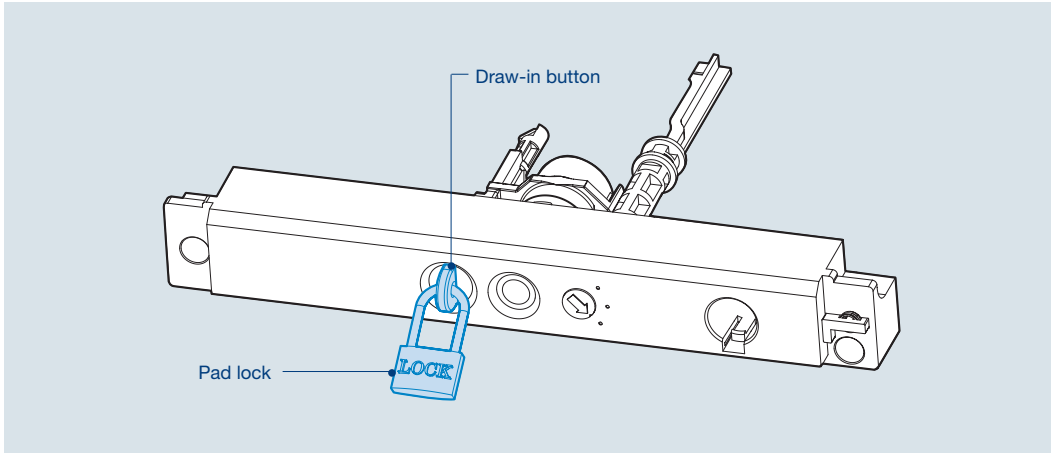


- When panel door is opened, Draw in/out handle cannot be inserted. Thus, panel handle can be inserted only when panel door is closed.

Accessories

Susol

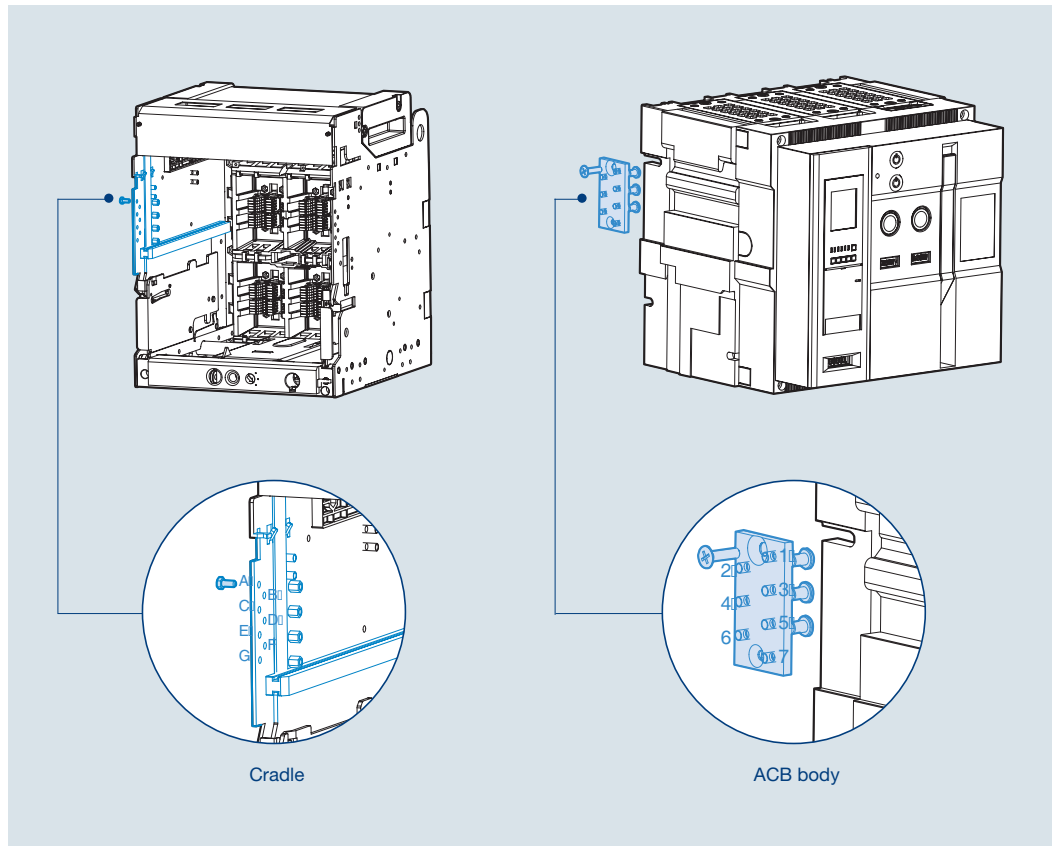
Lockable Position Lock [PL]



ACB is subject to restriction regarding moving in connected, test, disconnected when drawing in or out. If main body of ACB is placed in 3 positions, it is locked and stopped when drawing in or out.

- As shown in the figure, if draw-in/out button pops out, it means locking is operating.
- To continue Draw-in/out operation, release lock by pushing Draw-in/out button
- When locked as shown in the figure above, the main body of ACB can not be drawn in or out into the cradle.
- User must provide padlock. ($\varnothing 5 \sim \varnothing 6$)

Mis-Insertion Prevention Device [MIP]



- Mechanically prevents the ACB from being inserted into the cradle if the rating of the ACB does not match that of the cradle.
- The installation method is variable according to ratings.

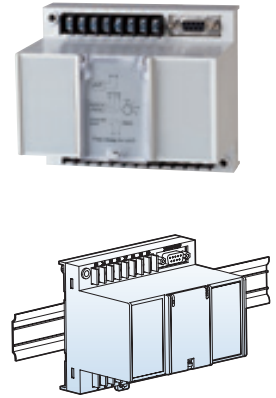
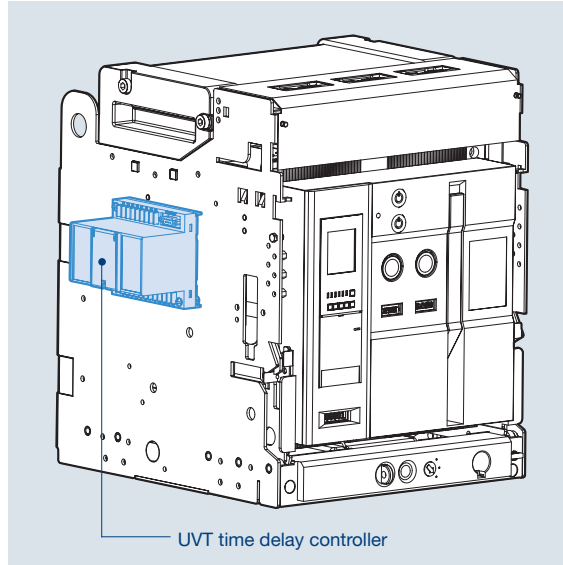
Cradle	ACB	Cradle	ACB	Cradle	ACB	Cradle	ACB
ABCD	567	ADEF	237	ABEG	346	BCEG	146
ABCE	467	ADEG	236	ABFG	345	BDEF	137
ABCF	457	ADFG	235	ACDE	267	BDEG	136
ABCG	456	AIEFG	234	ACDF	257	BDFG	135
ABDE	367	BCDE	167	ACDG	256	CDEF	127
ABDF	357	BCDF	157	ACEF	247	CDEG	126
ABDG	356	BCDG	156	ACEG	246	CEFG	124
ABEF	347	BCEF	147	ACFG	245	DEFG	123

Accessories

Susol

UVT Time Delay Controller [UDC]

- UVT is a device that trips the ACB automatically to prevent the accident on load side due to under voltage or power breakdown. There are two types: Instantaneous type and time delay type.
- Can be installed on the rail or the cradle.
- Instantaneous type: using only UVT coil.
- Time delay type: available by connecting UVT coil and UVT Time Delay Controller (UDC).
- Common use for all ACBs.

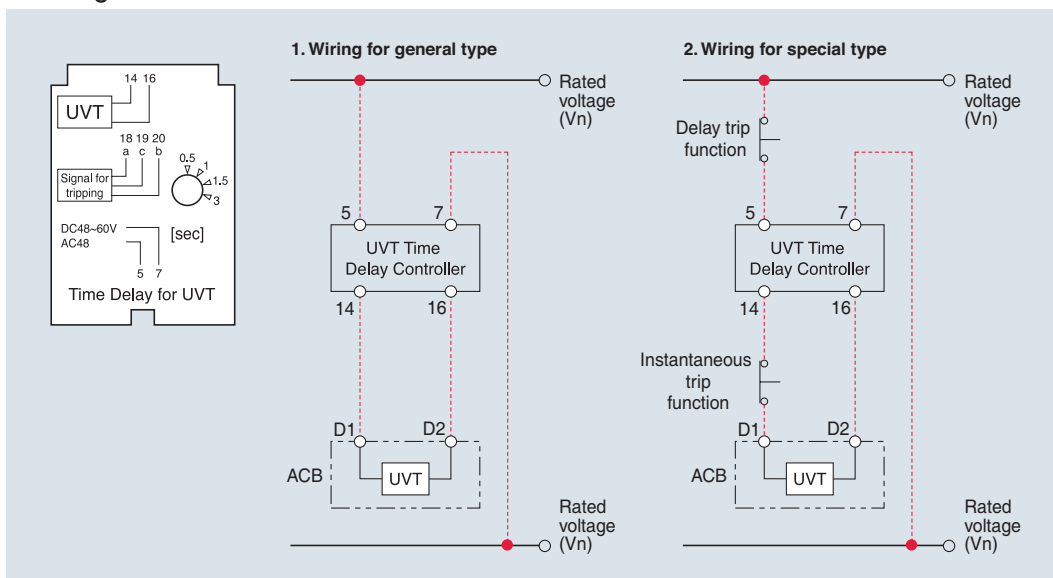


1. The rated voltage and characteristic of UVT time delay controller

Rated voltage [Vn]		Operating voltage range [V]		Power consumption (VA or W)		Trip time[s]
DC [V]	AC [V]	Pick up	Drop out	Inrush	Steady-state	
48~60	48	0.65~0.85 Vn	0.4~0.6 5Vn	200	5	0.5, 1, 1.5, 3
100~130	100~130					
200~250	200~250					
-	380~480					

Note) Operating voltage range is the min. rated standard for each rated voltage (Vh).

2. Wiring



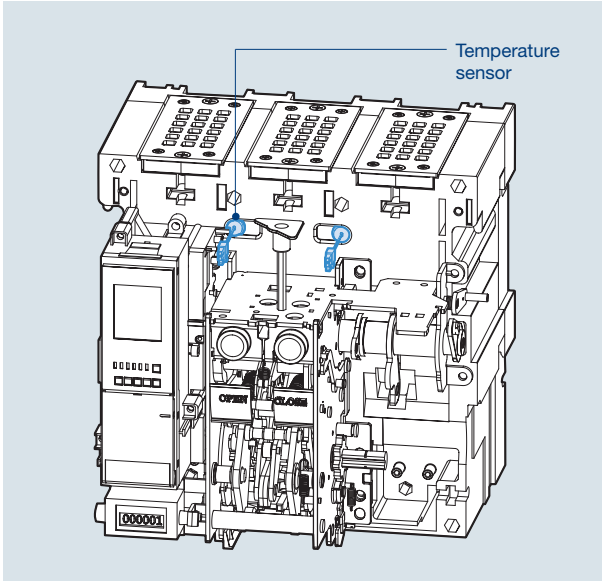
* The wiring presented with red color should be set by users.

Accessories

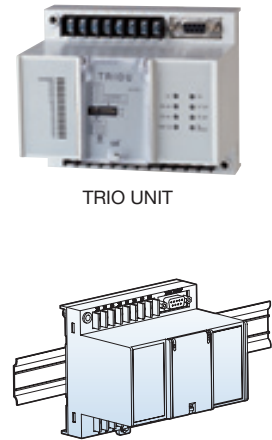
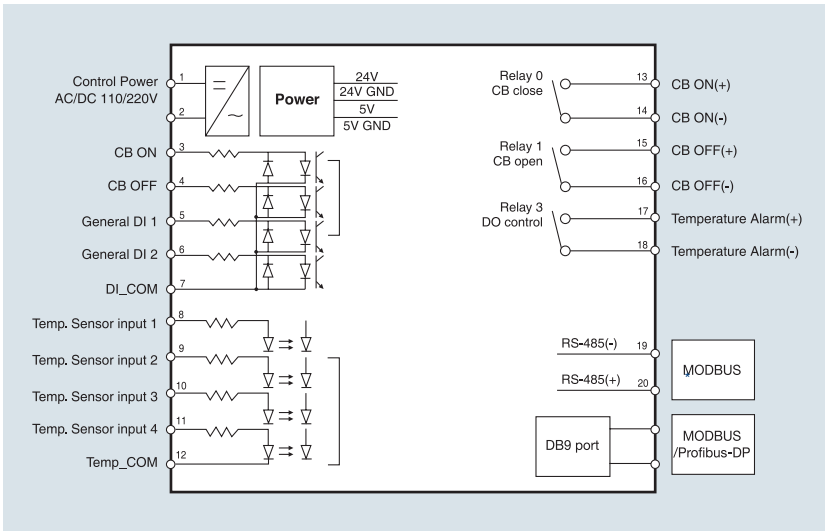
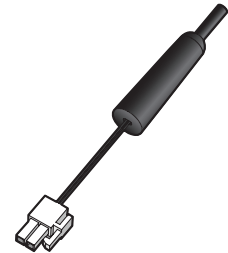
Susol

Temperature Remote I/O Unit [TRIO Unit]

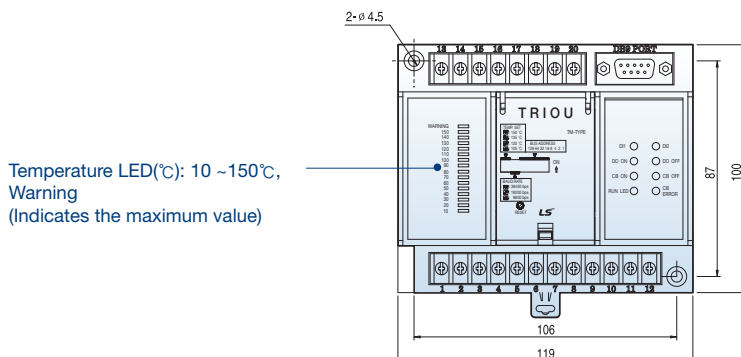
Temperature monitoring function



- TRIO unit is a device that indicates the temperature through a sensor inside of the ACB.
- Up to 2 temperature sensors can be installed and the output is connected to control terminal blocks.
- It displays the maximum temperature and transmits the data through a network.
- If the temperature is higher than a set temperature, an alarm will go off.
- TRIO unit communicates with Modbus / RS-485 as a default; Profibus-DP option must be purchased separately.
- TRIO unit is installed on the cradle or the inside of panel.



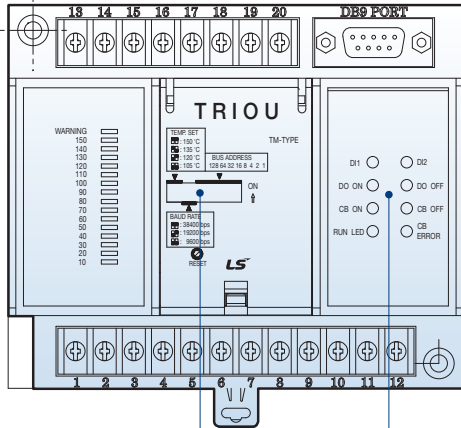
* DB9 Port is connected only when a repeater is used.



Accessories

Susol

Remote control function (CB ON/OFF)



- Baud rate setting
- Comm. address setting
- Temperature setting

- TRIO unit has the I/O contact which can trip or close the ACB from the remote site by communication.
- Supports SBO (Select Before Operation) function

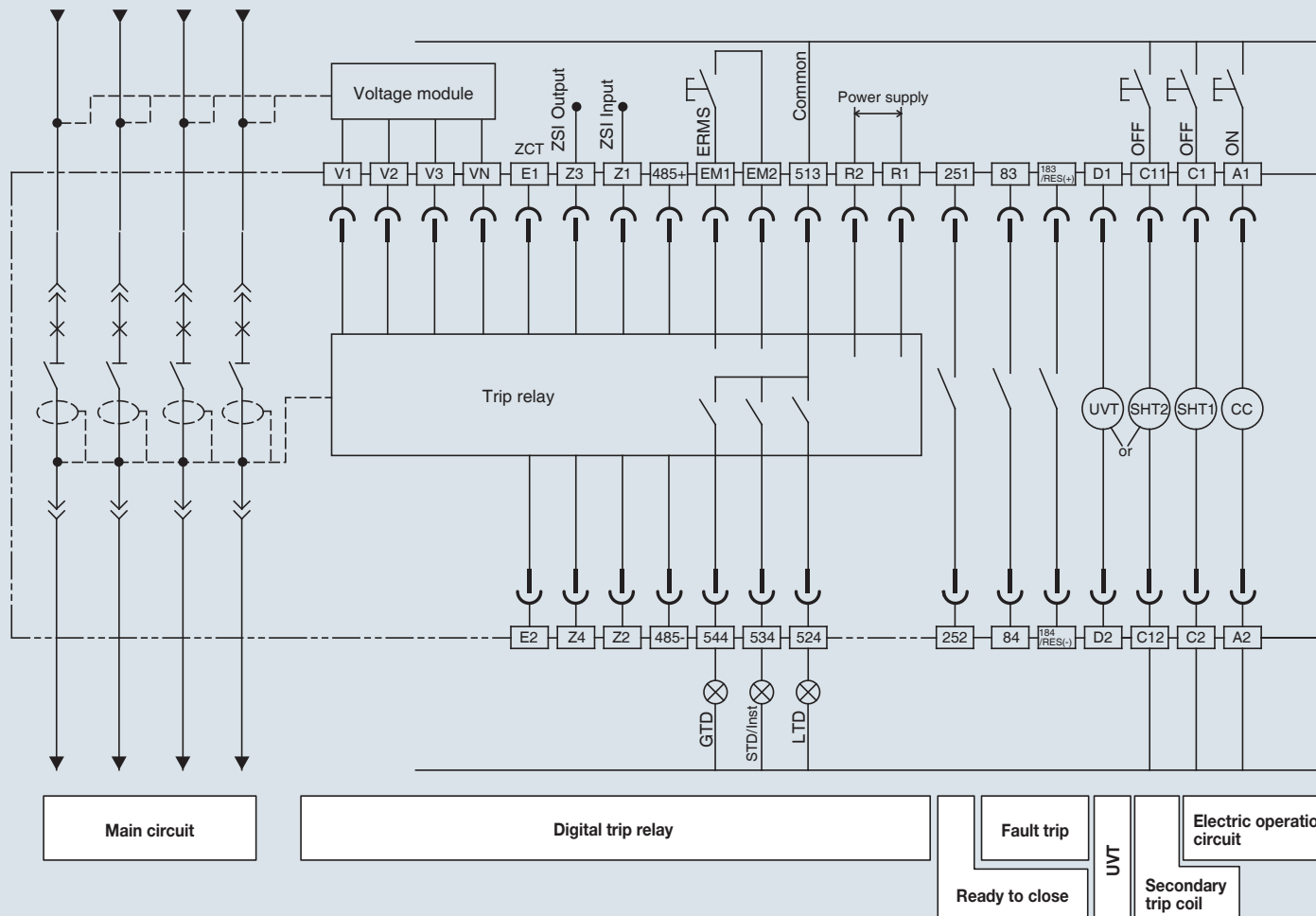
LED	Status	
1	DI1	Indicates digital Input #1condition
2	DI2	Indicates digital Input #2condition
3	DO ON	Indicates temperature alarm output is ON
4	DO OFF	Indicates temperature alarm output is OFF
5	CB ON	Indicates circuit break close condition
6	CB OFF	Indicates circuit break open condition
7	RUN LED	Indicates unit run condition
8	CB ERROR	Indicates circuit break terminal Disconnection / control Err condition

Classification		Applied range	Remarks
CB control	Contact switching capacity	AC230V 16A/DC30V 16A	
	Max. switching capacity	3680VA, 480W	
Alarm	Contact switching capacity	AC230V 6A/DC25V 6A	Induction load (cosØ=0.4, L/R=7ms)
	Max. switching capacity	1880VA, 150W	

Electrical diagram

Susol

This diagram is based on "CONNECTED" position of a circuit breaker and Opening, Motor charging, Releasing of locking plate should be normal condition.

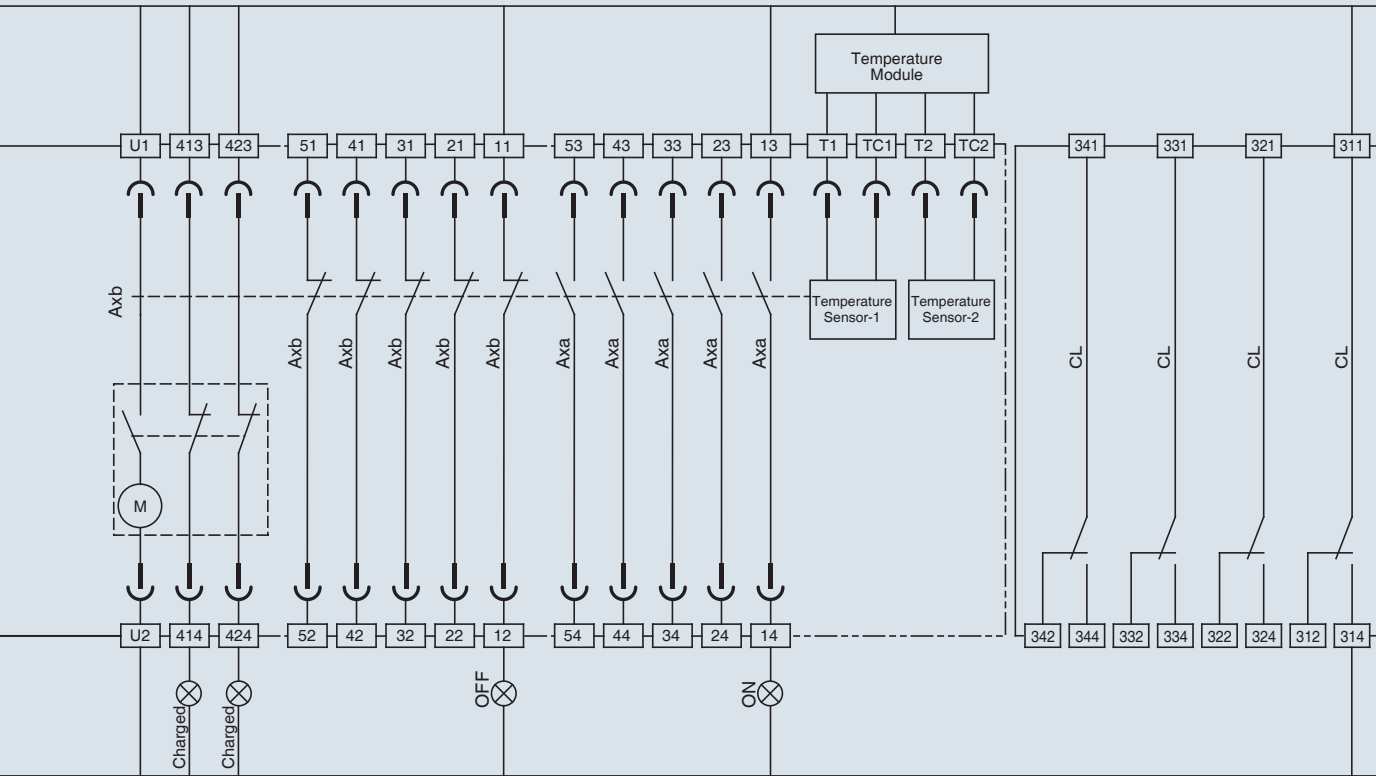


Terminal code description

13	14	~	63	64	Auxiliary switch "a"
11	12	~	61	62	Auxiliary switch "b"
413	414				Charged signal
423	424				Charged signal communication
U1	U2				Motor charging
A1	A2				Closing coil
C1	C2				Shunt trip
C11	C12				2nd shunt trip

D1	D2	Voltage input terminal of UVT	
83	84	Alarm1 "a"	
183	184	Alarm2 "a"	
251	252	Ready to close switch	
R1	R2	Control power	
513	~	544	Alarm contact
EM1	EM2	ERMS	
485+	485-	RS-485 communication	

- Note) 1. The diagram is shown with circuits de-energized, all devices open, connected and charged and relays in normal position
 2. Relay is normal condition and charging type is "ON-Charging"
 3. The standard auxiliary contact is 3a3b. The auxiliary switch in above diagram is composed of 5a5b. See page 59 for more detail on auxiliary switches.
 4. Option
 - Ready to close contact, Trip alarm contact, UVT coil, Fully charged contact, secondary trip coil
 - Cell switch, Temperature module, Voltage module, Remote close-open module, ZCT, ZSI
 5. Please consult us for the use of ZSI (Zone selective Interlocking).
 6. Refer to the page 24 for the connection of Trip relay and the page 56 for UVT.
 7. For connecting RS-485 verify if the polarity is correct



Charge completion contact

Auxiliary switch

Thermal, communication remote control module

Cell switch

Accessory code description

Z1 Z2	ZSI input
Z3 Z4	ZSI output
E1 E2	ZCT
VN ~ V3	Voltage module
TC1, TC2 ~ T1, T2	Temperature module
311 ~ 344	Position switch

Ax	Auxiliary switch
LTD	Long time delay trip indicator
STD/Inst	Short time delay/instantaneous
GTD	Ground fault trip indicator
CL	Cell switch
(M)	Motor
(CC)	Closing coil
(SH1)	Shunt tripping device 1
(SH2)	Shunt tripping device 2
(UVT)	UVT coil

—	Internal wiring
—	External wiring (by customer)
⌋	Connector of the control circuit terminal of drawout type

Dimensions

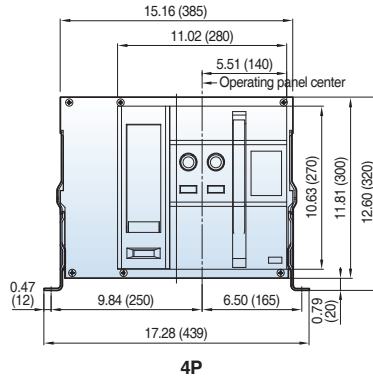
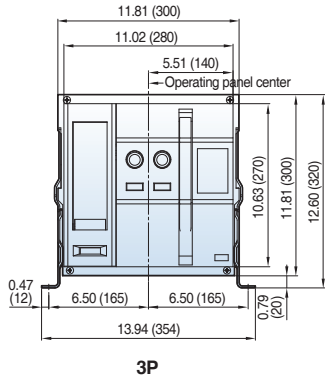
Susol

Fixed type 800~1600A (UAS-08/16D)

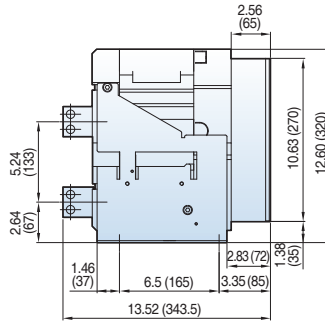
[inch (mm)]

Front view

Front view

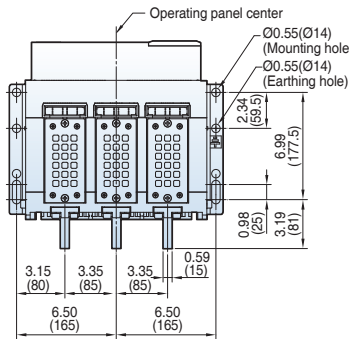


Side view

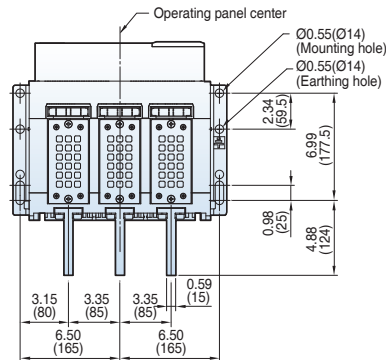


Vertical type_3P

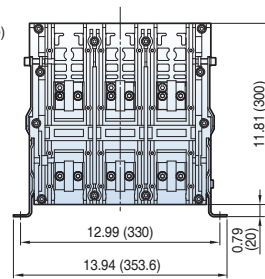
Vertical



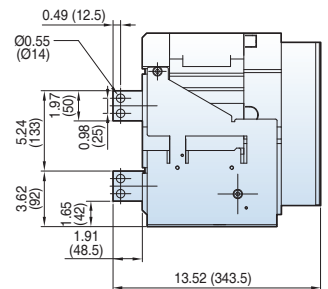
Vertical-con



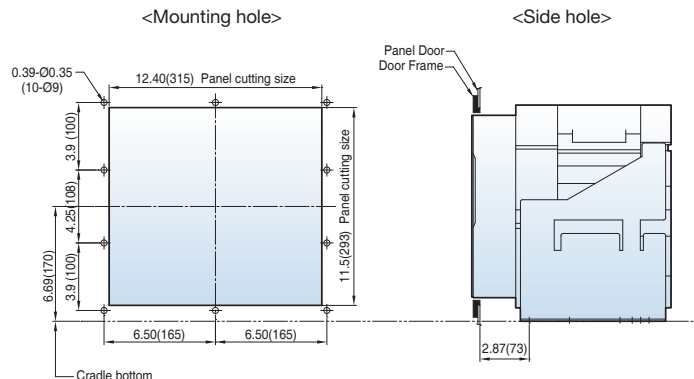
Back view



Side view



Door Frame: DF (UAS/UAH-D/E)



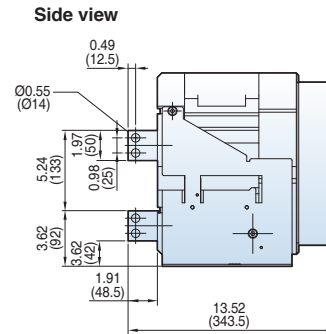
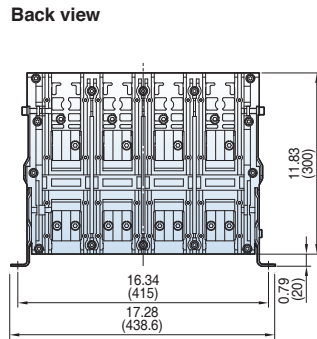
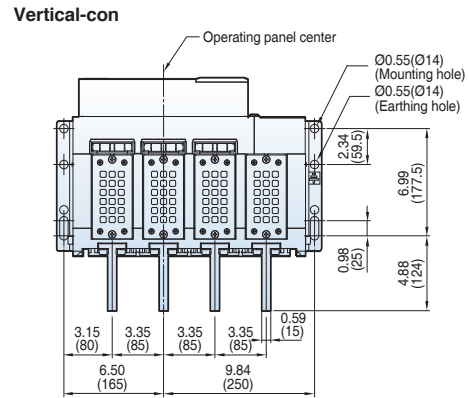
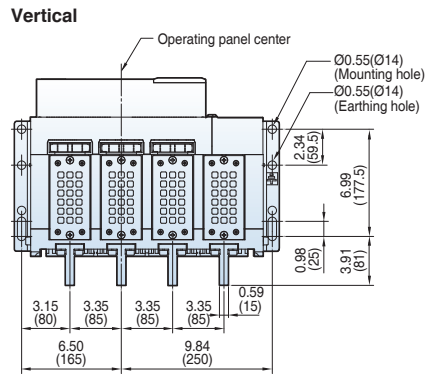
Note) The dimensions are for fixed type.

Dimensions

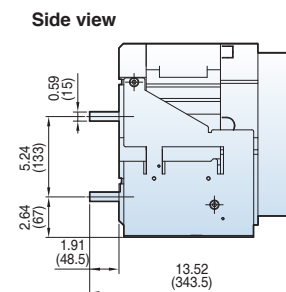
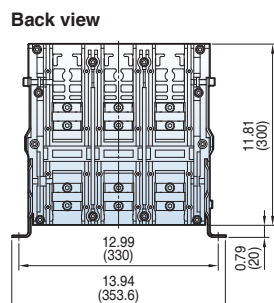
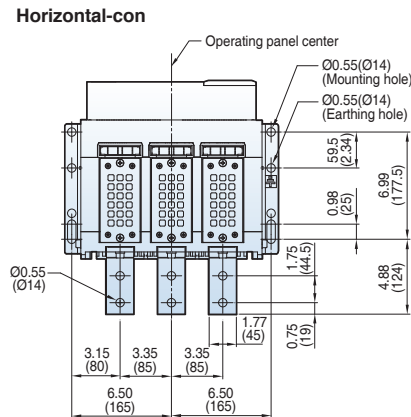
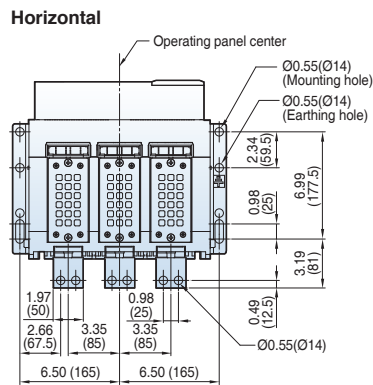
Susol

[inch (mm)]

Vertical type_4P



Horizontal type_3P



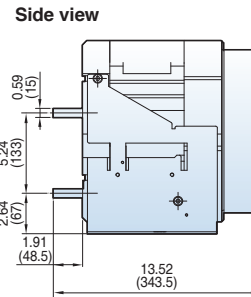
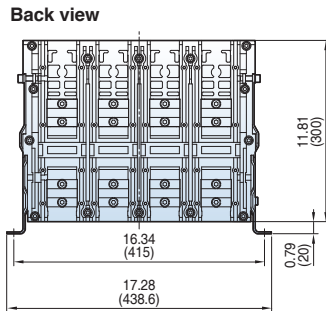
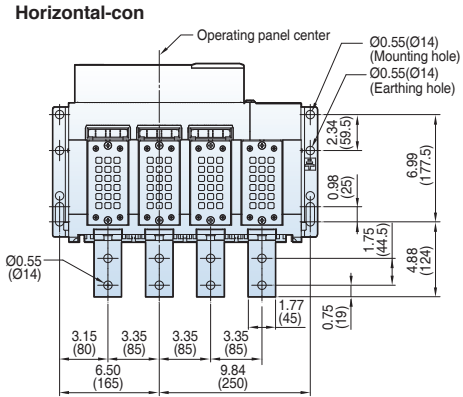
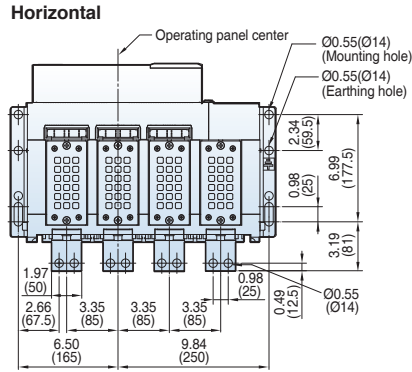
Dimensions

Susol

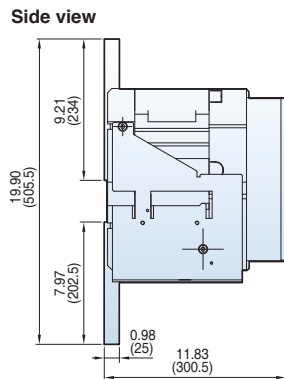
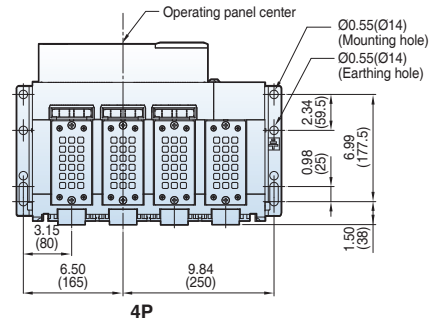
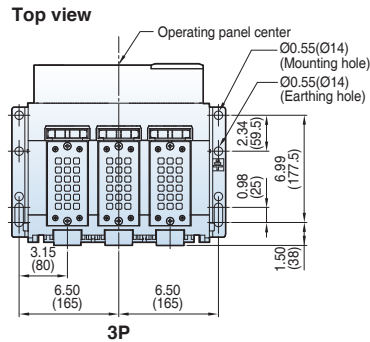
Fixed type 800~1600A (UAS-08/16D)

[inch (mm)]

Horizontal type_4P



Front connection type



Dimensions

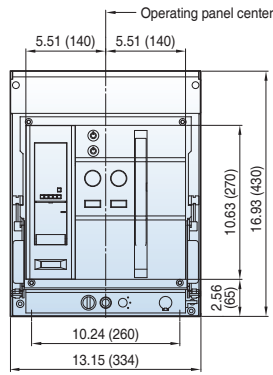
Susol

Draw-out type 800~1600A (UAS-08/16D)

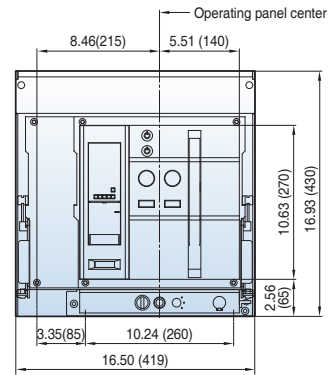
[inch (mm)]

Front view

Front view



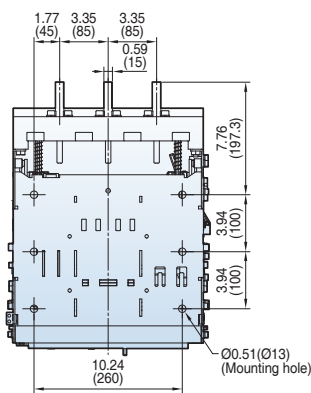
3P



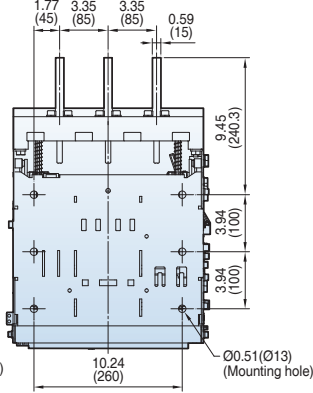
4P

Vertical type_3P

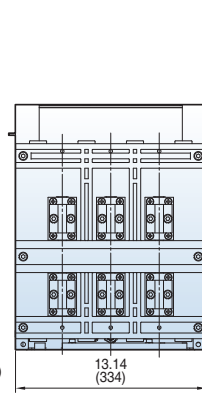
Bottom view



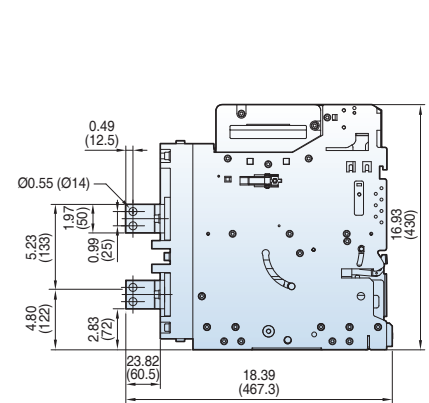
Vertical-con



Back view

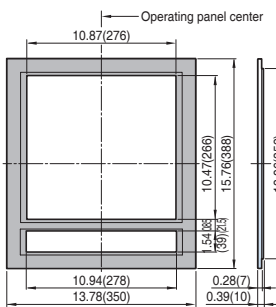


Side view



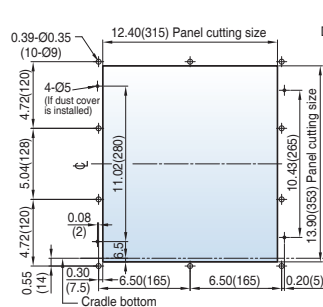
Door Frame: DF (UAS/UAH-D/E)

<Mounting hole>

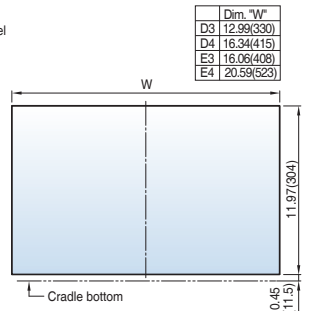
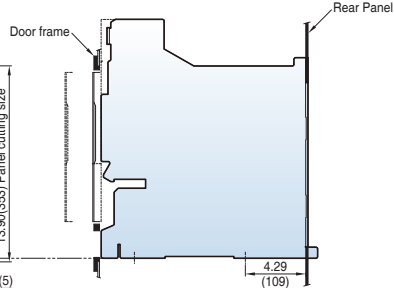


<External size>

<Side hole>



<Panel cutting >



Dim. "W"
D3 12.99(330)
D4 16.34(415)
E3 16.06(408)
E4 20.59(523)

Note) The dimensions are for drawout type.

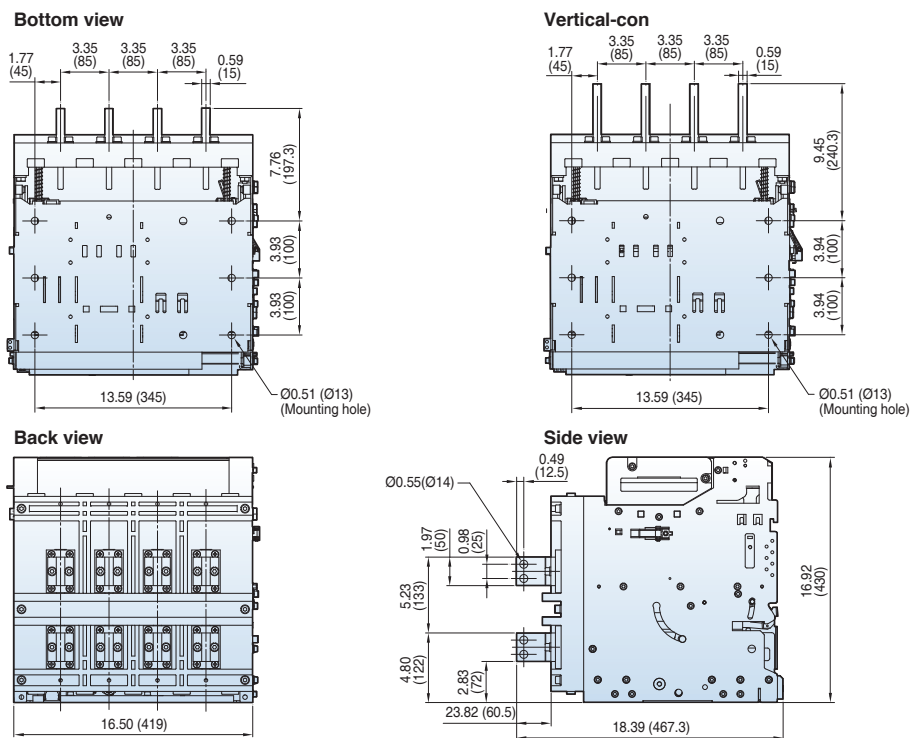
Dimensions

Susol

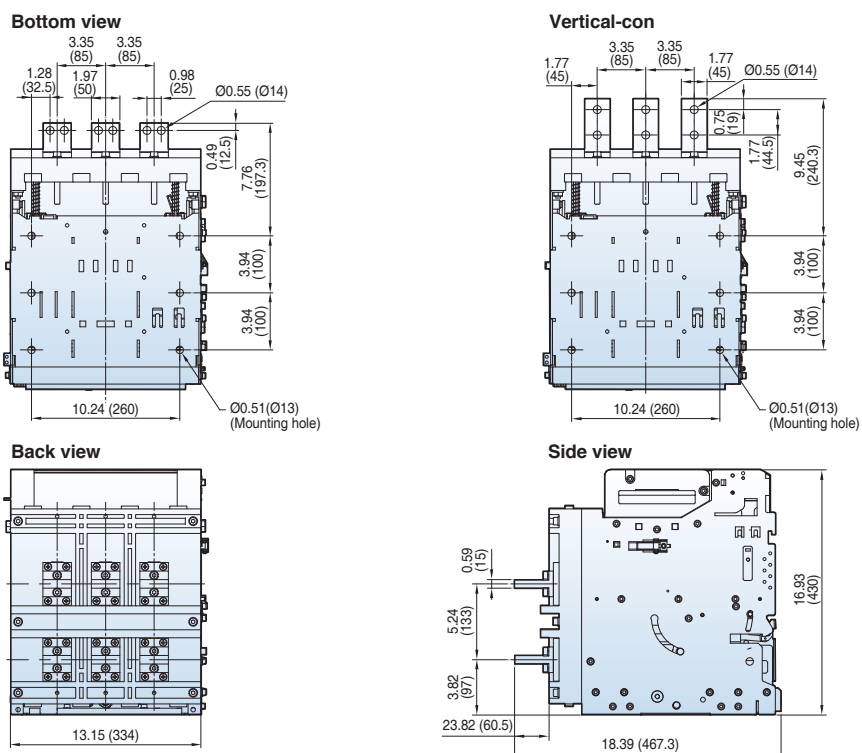
Draw-out type 800~1600A (UAS-08/16D)

[inch (mm)]

Vertical type_4P



Horizontal type_3P

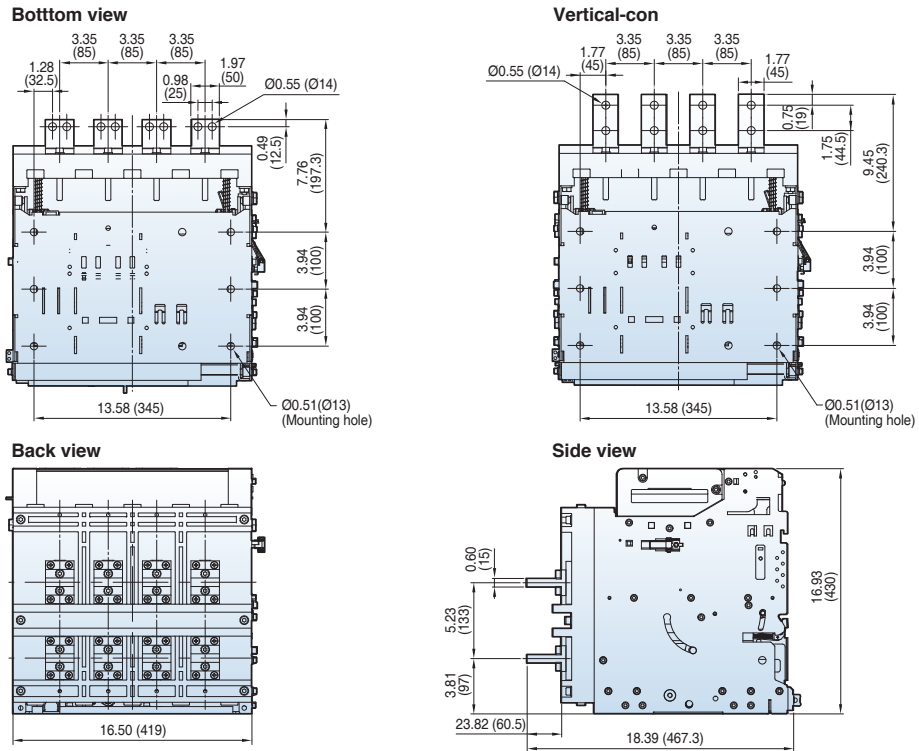


Dimensions

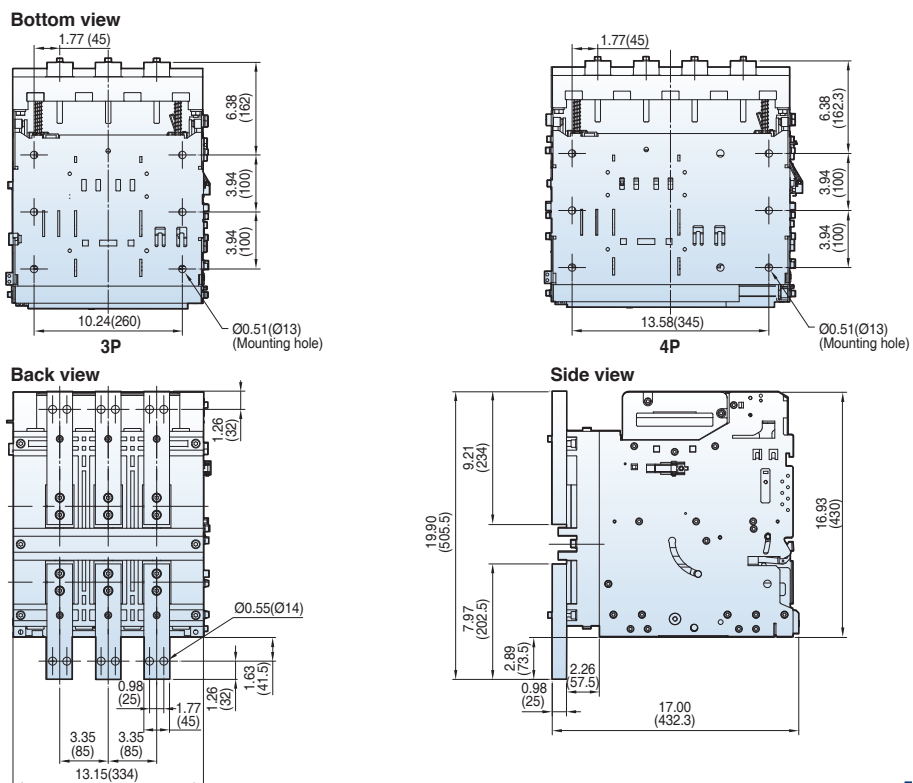
Susol

[inch (mm)]

Horizontal type_4P



Front connection type



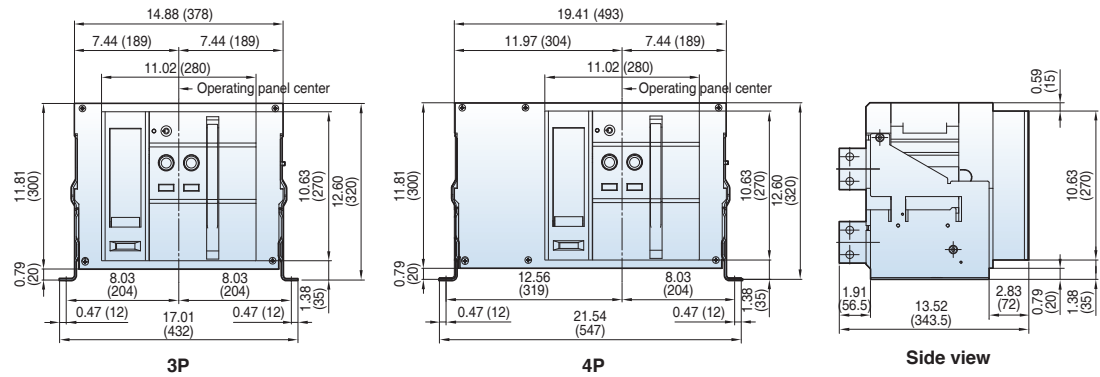
Dimensions

Susol

Fixed type 800~2000A (UAH-08~20E)

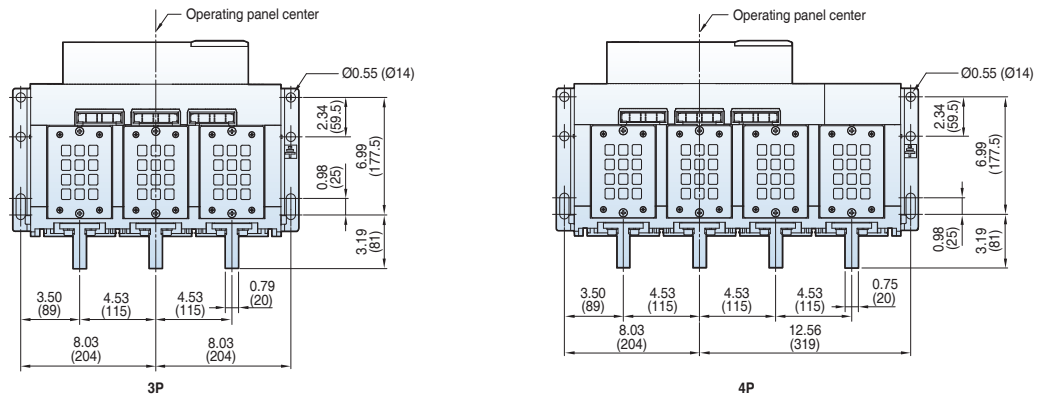
[inch (mm)]

Front view

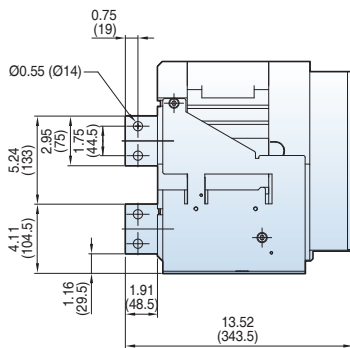


Vertical type

Top view



Side view

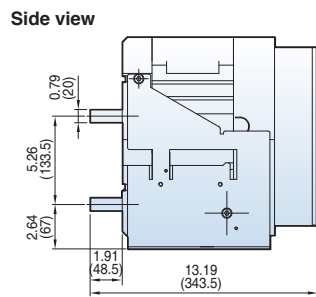
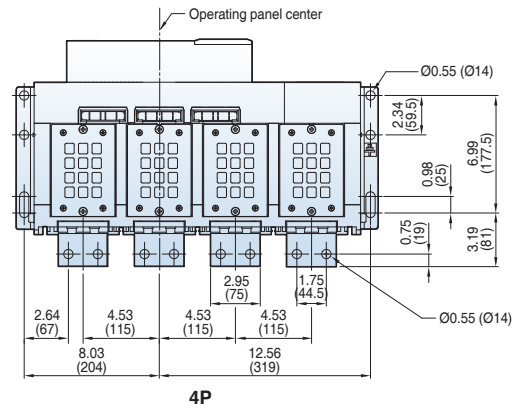
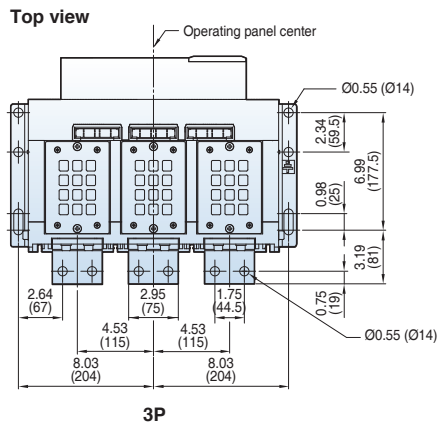


Dimensions

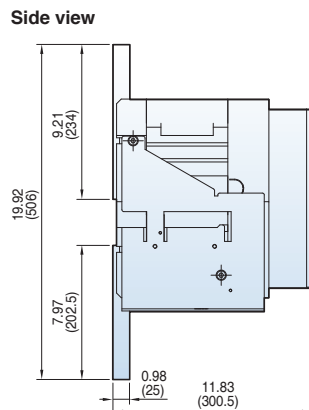
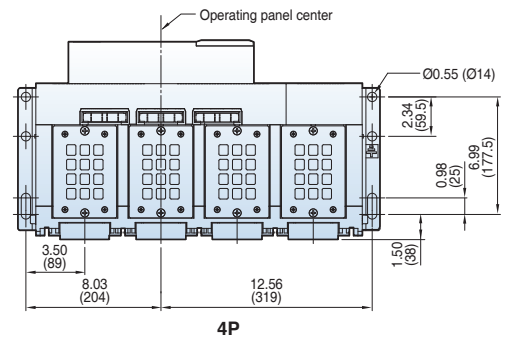
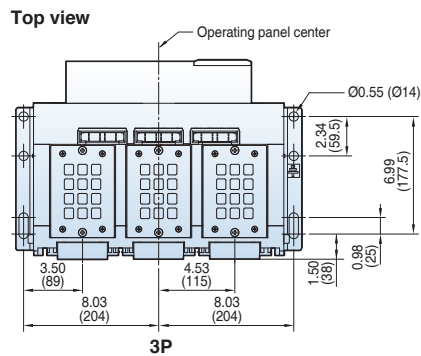
Susol

[inch (mm)]

Horizontal type



Front connection type



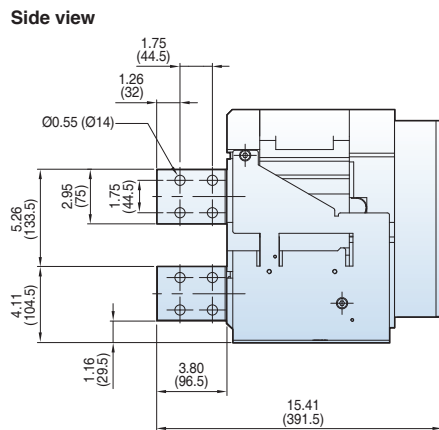
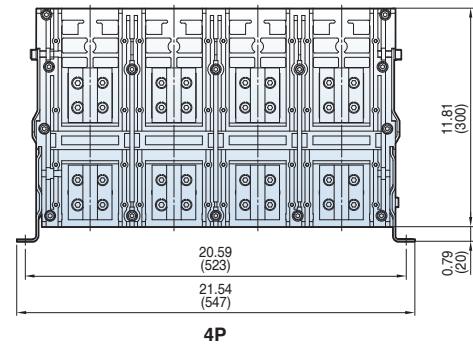
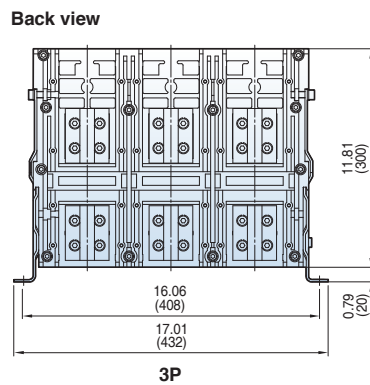
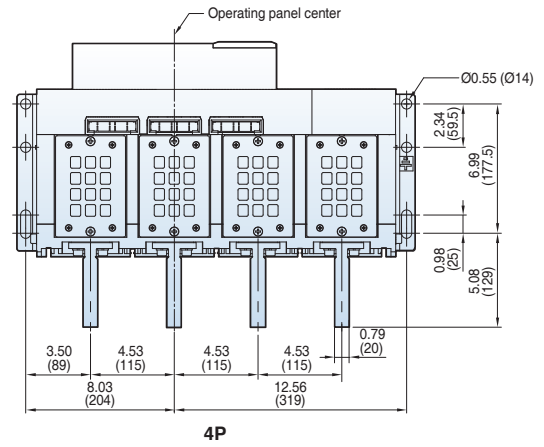
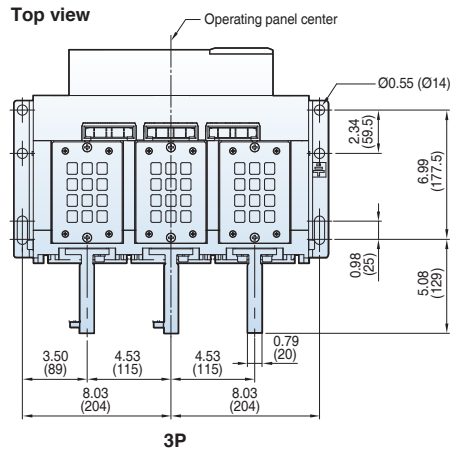
Dimensions

Susol

Fixed type 2500A (UAH-25E)

[inch (mm)]

Vertical
type

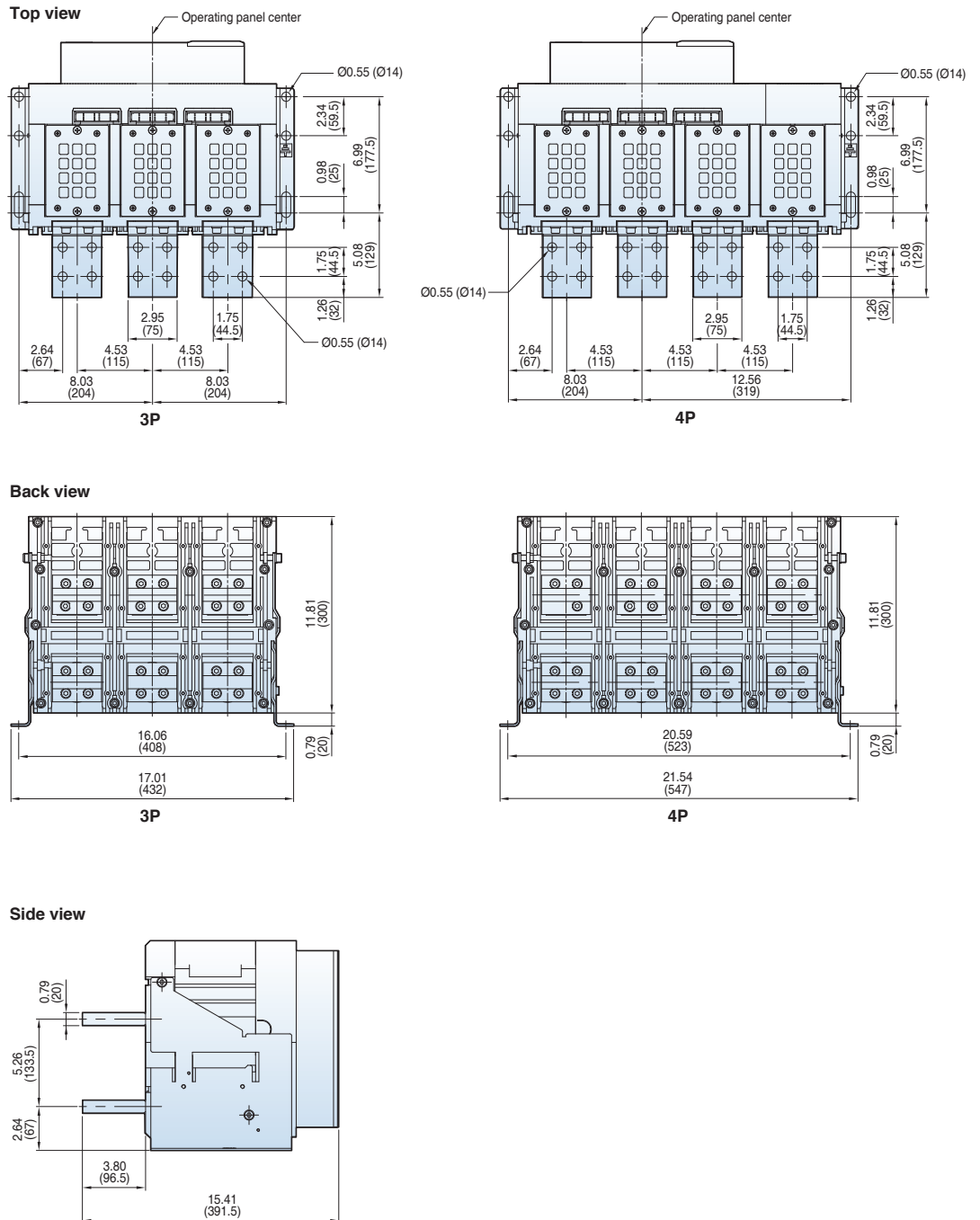


Dimensions

Susol

[inch (mm)]

Horizontal type



Dimensions

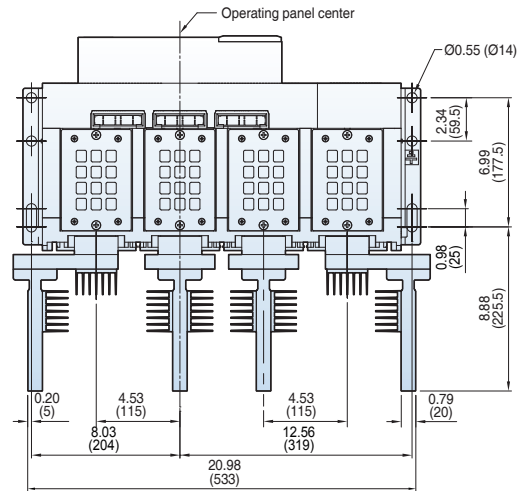
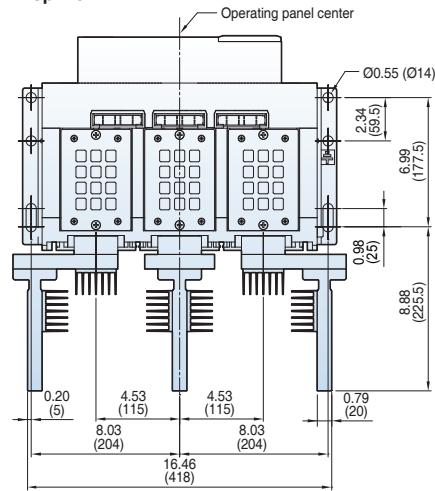
Susol

Fixed type 3200A (UAH-32E)

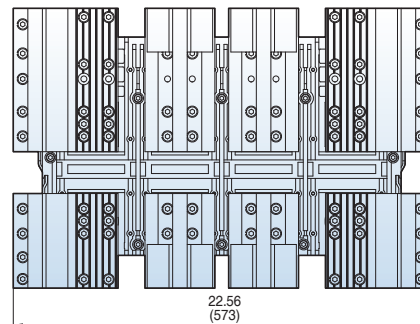
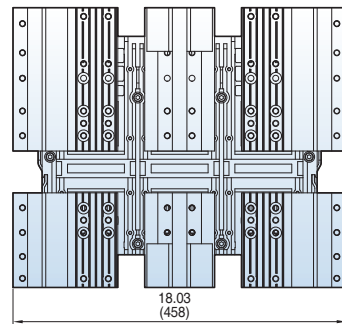
[inch (mm)]

Vertical
type

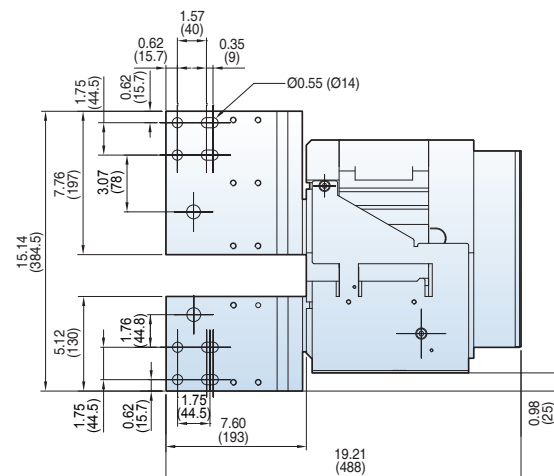
Top view



Back view



Side view



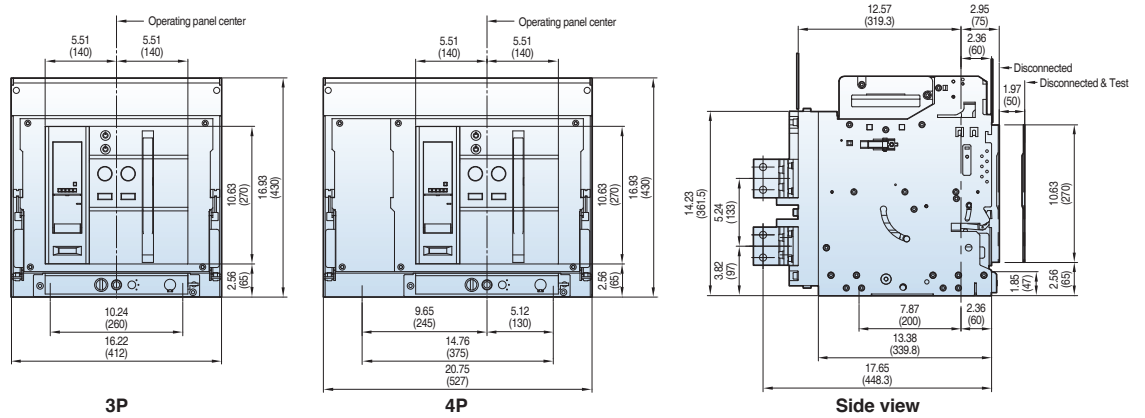
Dimensions

Susol

Draw-out type 800~2000A (UAH-08~20E)

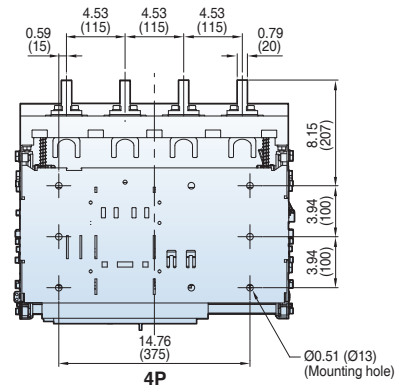
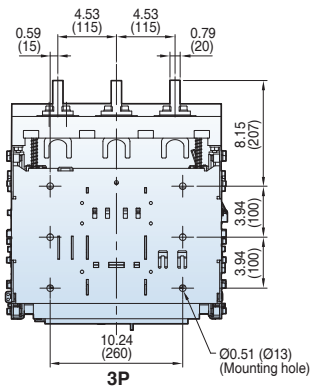
[inch (mm)]

Front view

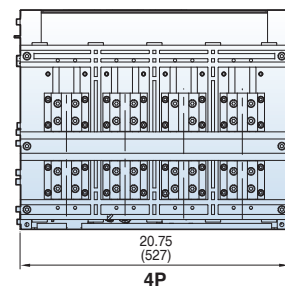
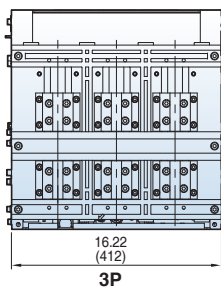


Vertical type

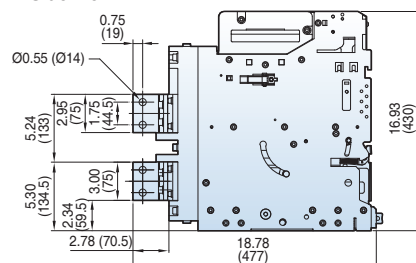
Bottom view



Back view



Side view



Dimensions

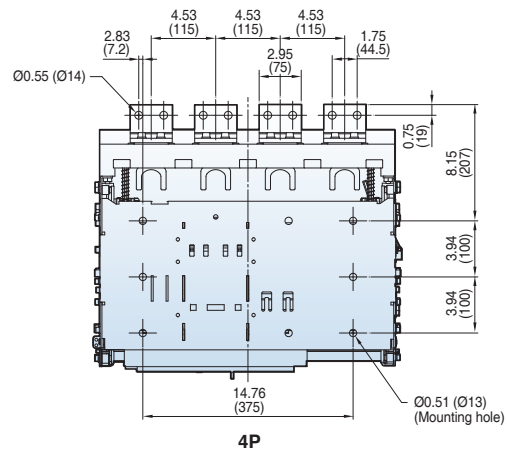
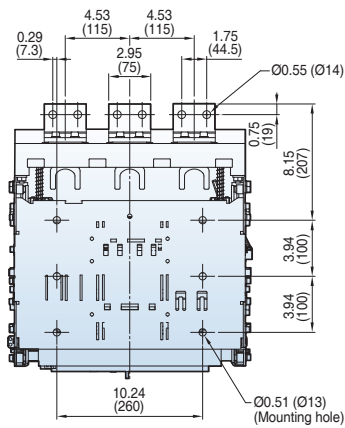
Susol

Draw-out type 800~2000A (UAH-08~20E)

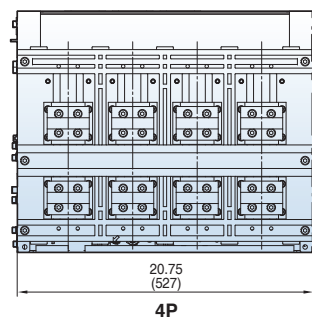
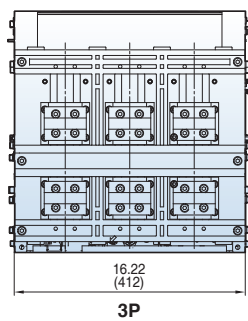
[inch (mm)]

Horizontal type

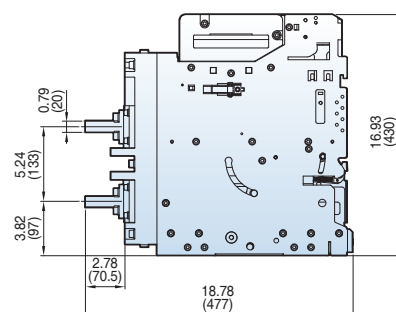
Bottom view



Back view



Side view



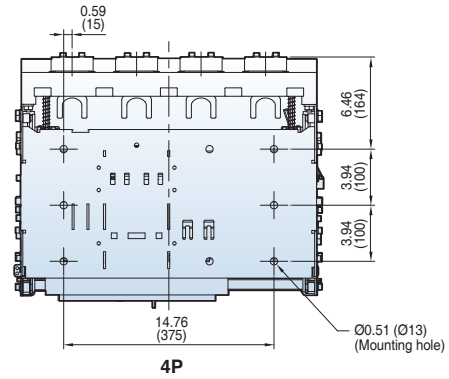
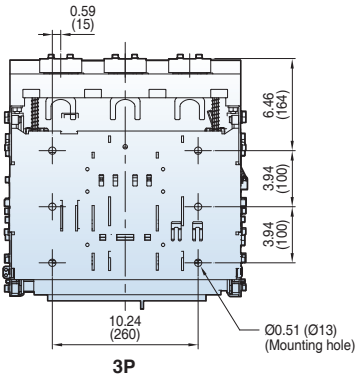
Dimensions

Susol

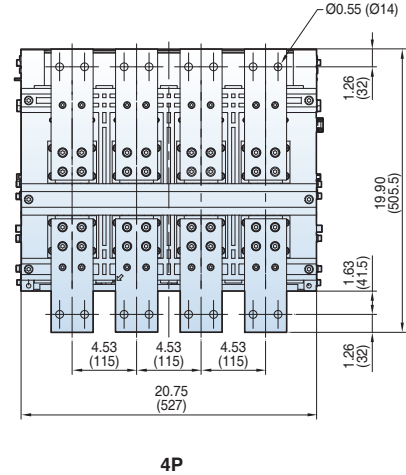
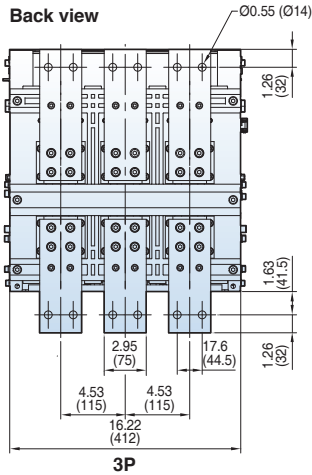
[inch (mm)]

Front connection type

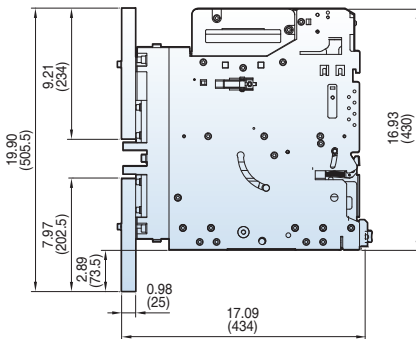
Bottom view



Back view



Side view



Dimensions

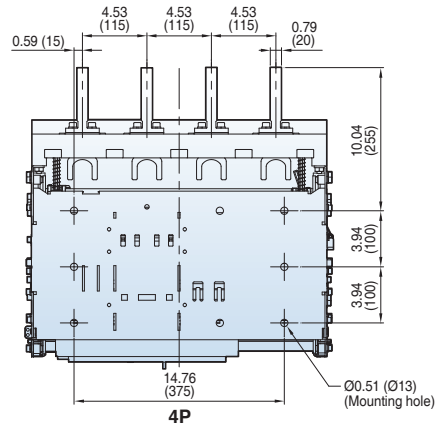
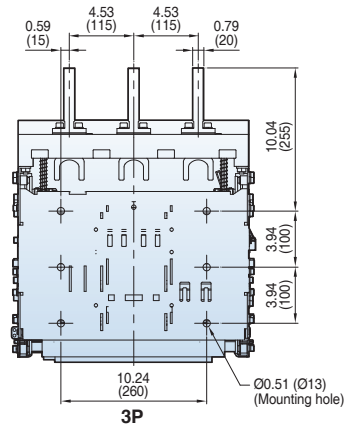
Susol

Draw-out type 2500A (UAH-25E)

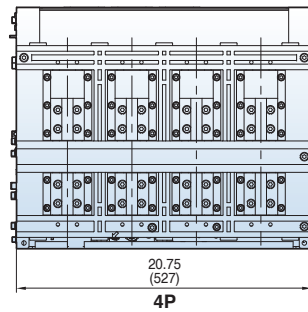
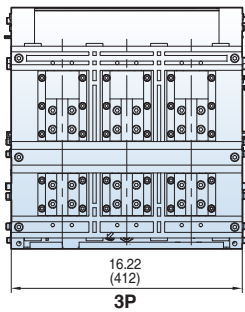
[inch (mm)]

Vertical
type

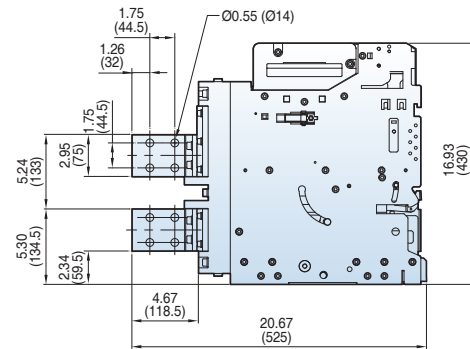
Bottom view



Back view



Side view



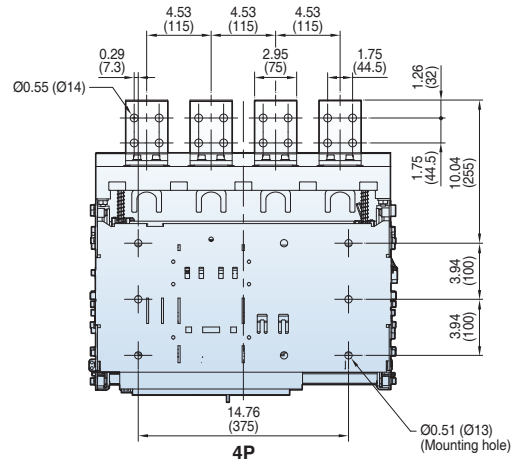
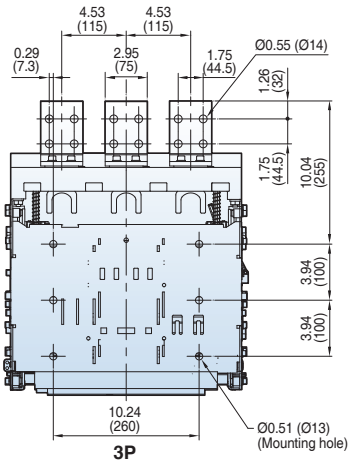
Dimensions

Susol

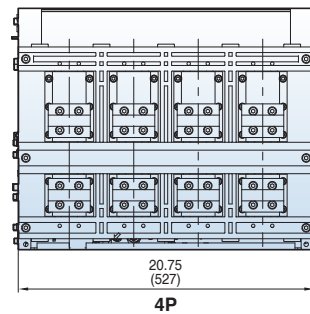
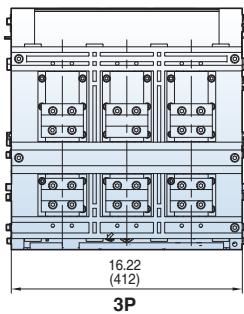
[inch (mm)]

Horizontal type

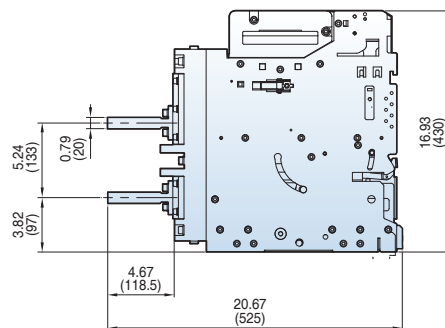
Bottom view



Back view



Side view



Dimensions

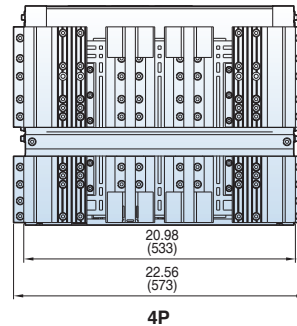
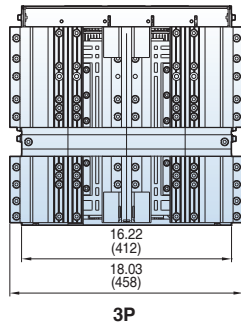
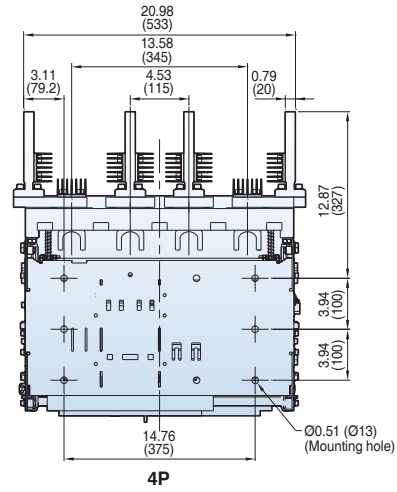
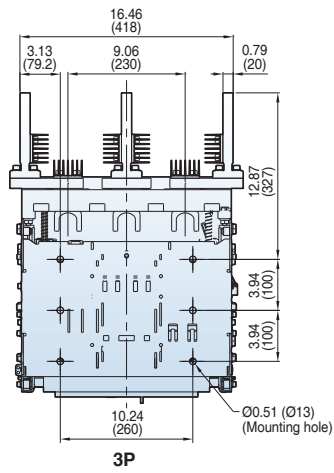
Susol

Draw-out type 3200A (UAH-32E)

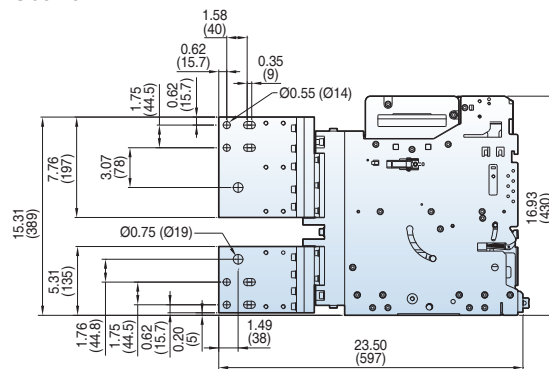
[inch (mm)]

Vertical
type

Bottom view



Side view



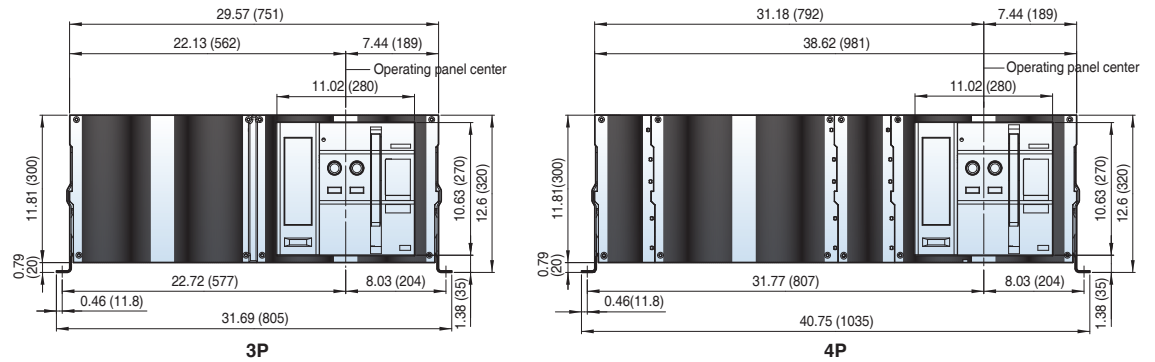
Dimensions

Susol

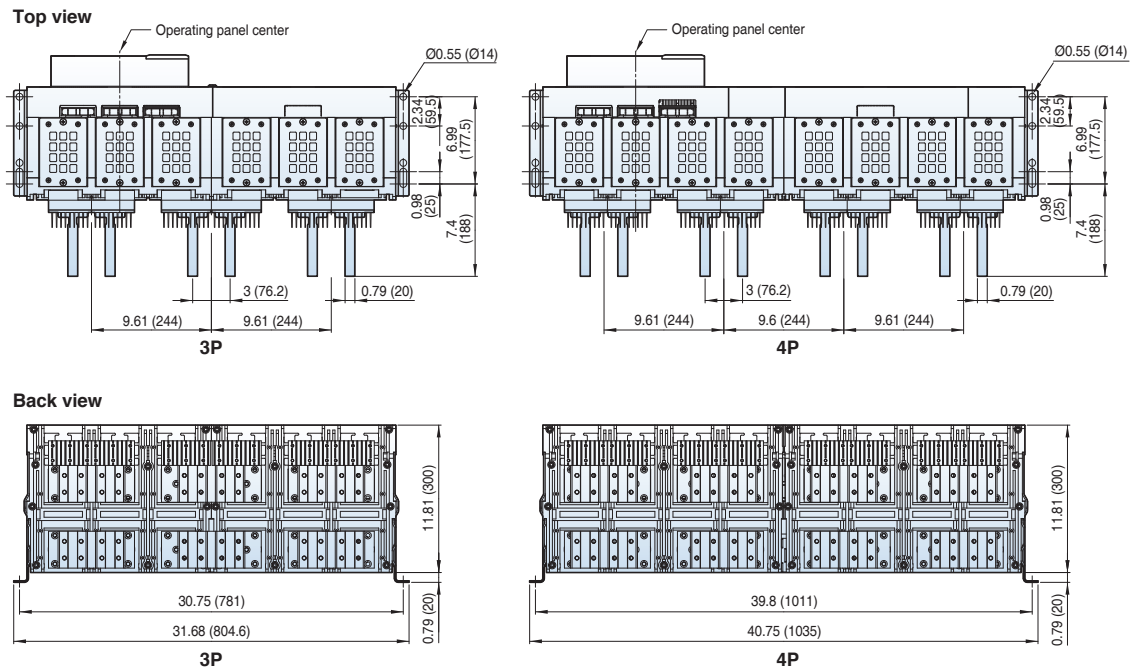
Fixed type 3200~5000A (UAH-32~50G)

[inch (mm)]

Front view



Vertical type



Dimensions

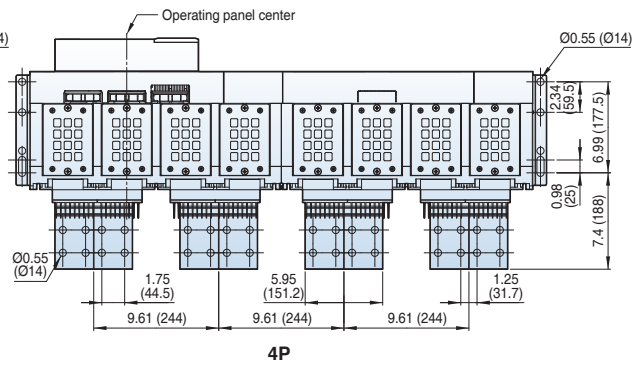
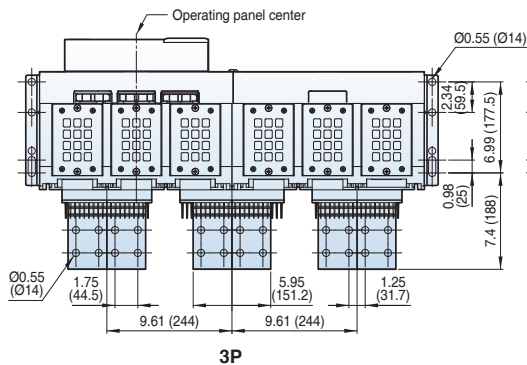
Susol

Fixed type 3200~5000A (UAH-32~50G)

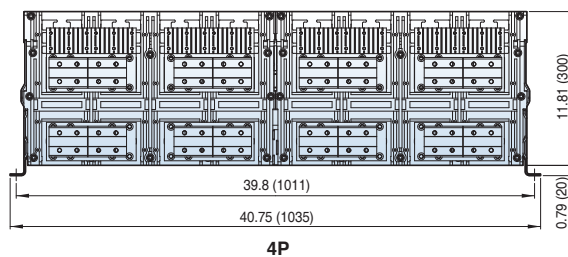
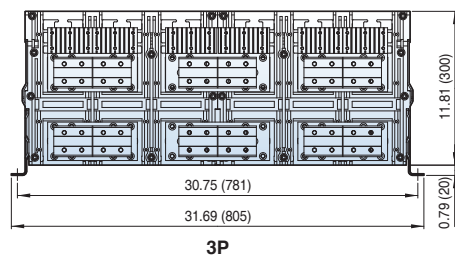
[inch (mm)]

Horizontal type

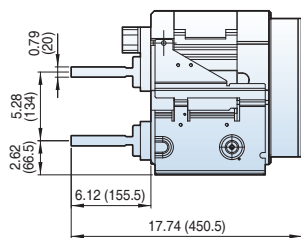
Top view



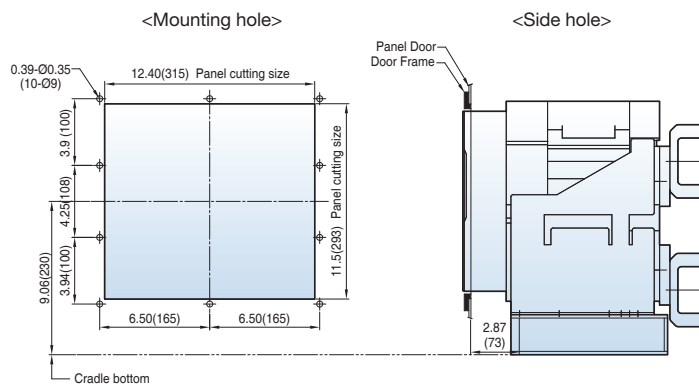
Back view



Side view



Door Frame: DF (UAH-G)



Note) The dimensions are for fixed type.

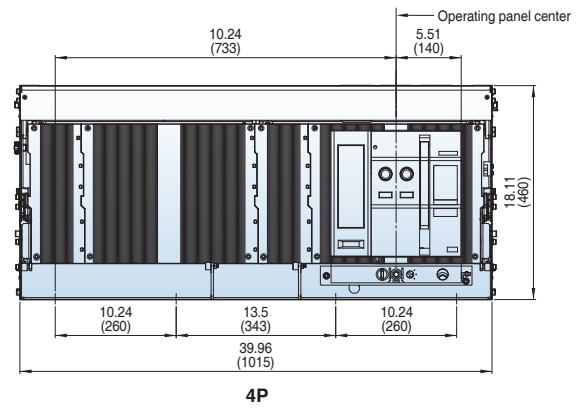
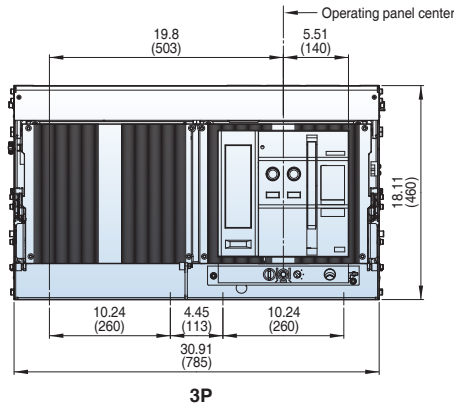
Dimensions

Susol

Draw-out type 3200~5000A (UAH-32~50G)

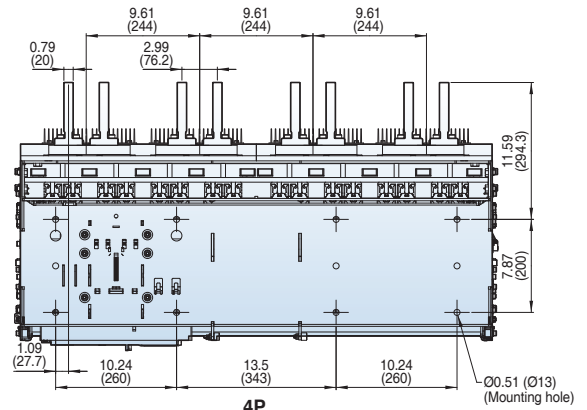
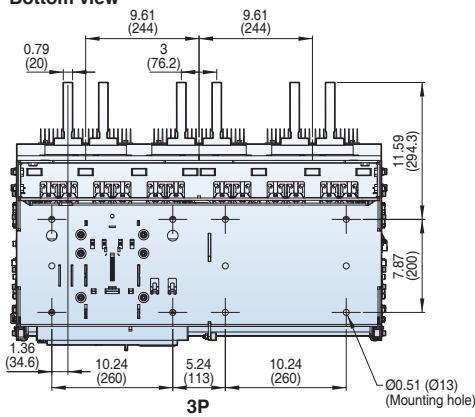
[inch (mm)]

Front view

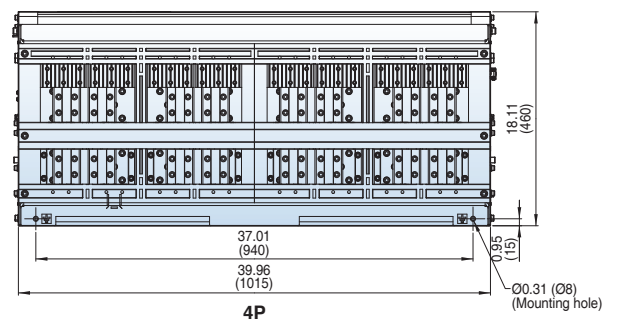
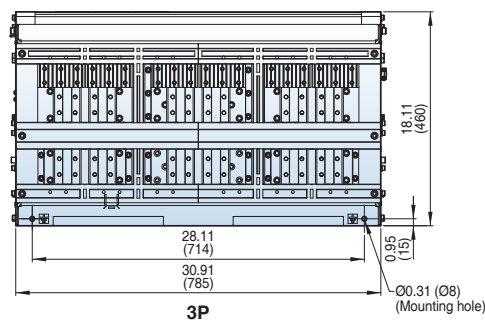


Vertical type

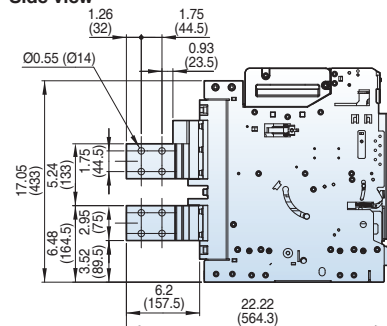
Bottom view



Back view



Side view



Dimensions

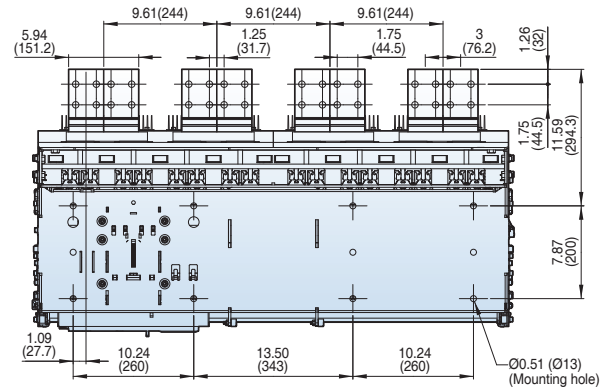
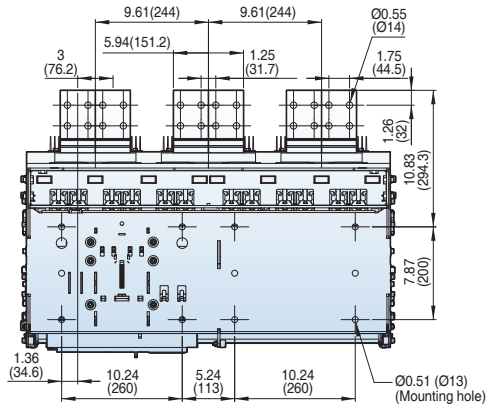
Susol

Draw-out type 3200~5000A (UAH-32~50G)

[inch (mm)]

Horizontal type

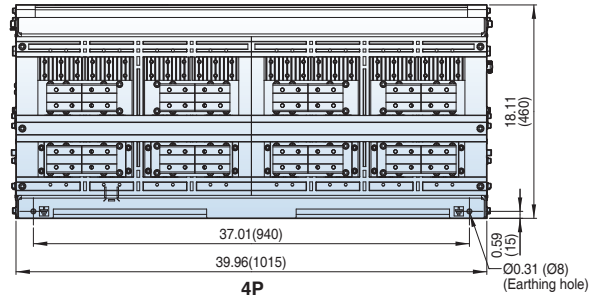
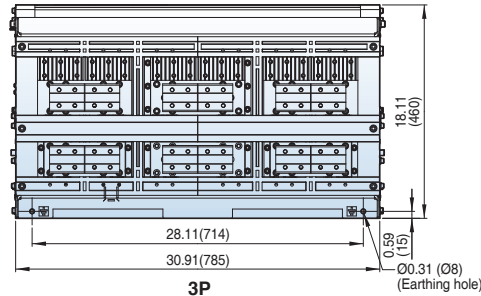
Bottom view



3P

4P

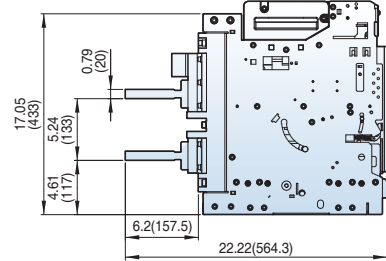
Back view



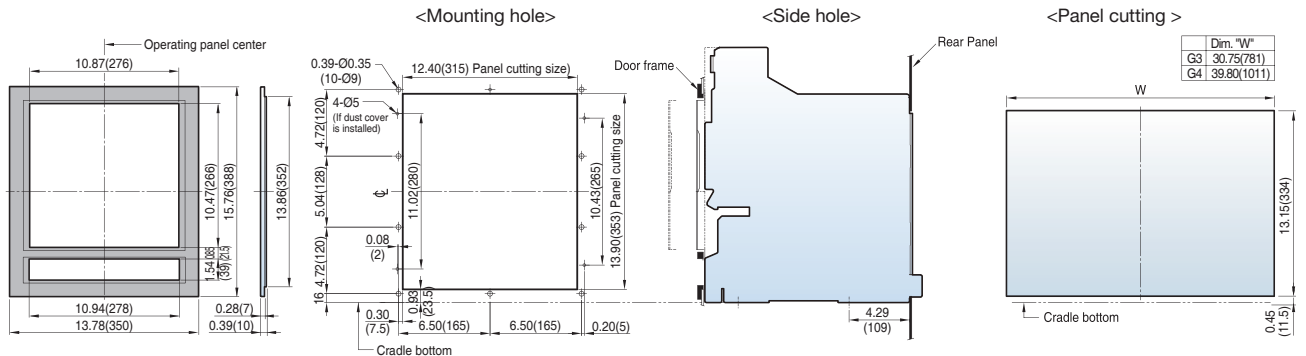
3P

4P

Side view



Door Frame: DF (UAH-G)



<External size>

Note) The dimensions are for drawout type.

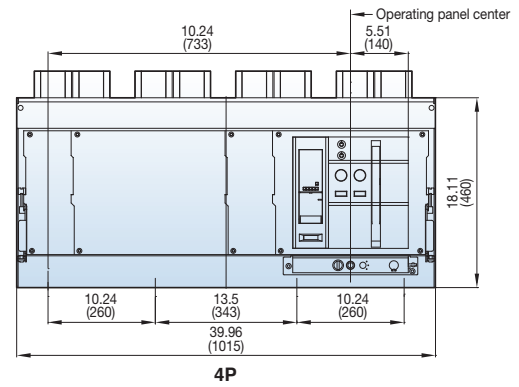
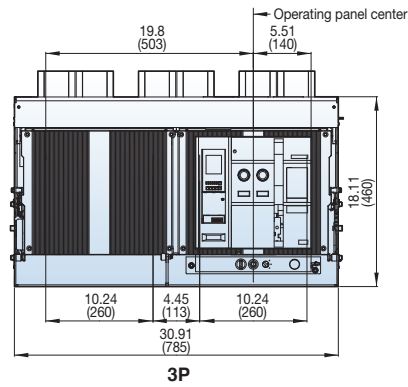
Dimensions

Susol

Draw-out type 3200~6000A (UAH-32~60G)

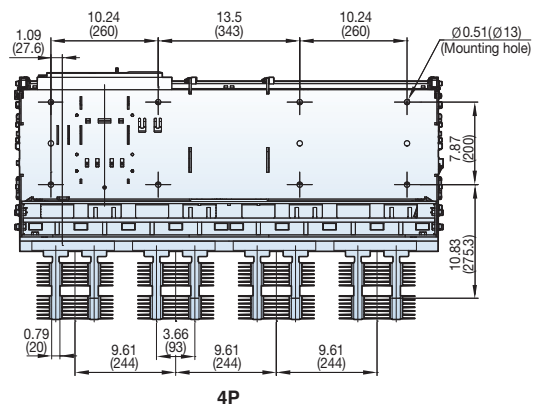
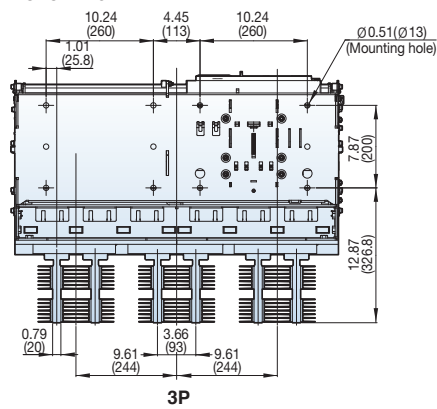
[inch (mm)]

Front view

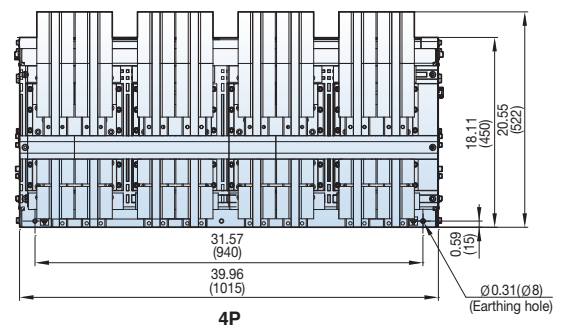
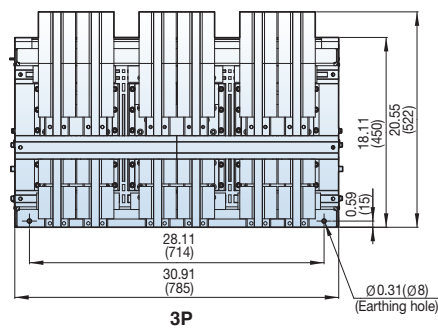


Vertical type

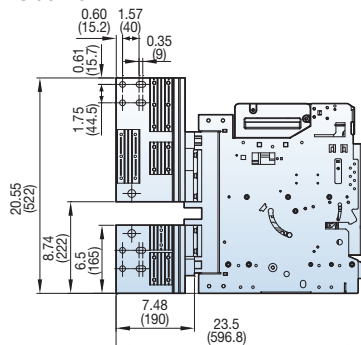
Bottom view



Back view



Side view





Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance. Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



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